REPORT RESUMES

ED 003 329 24
WORK LOAD OF UNIVERSITY PROFESSORS.
BY- FRENCH, JOHN R. P., JR. AND OTHERS
MICHIGAN UNIV., ANN ARBOR, INST. FOR SOCIAL RESEARCH
REPORT NUMBER CRP-2171 PUB DATE 65
EDRS PRICE MF-$0.45 HC-$11.12 278P.

DESCRIPTORS- UNIVERSITIES, *PROFESSORS, PERSONALITY STUDIES, HIGHER EDUCATION, *WORK ATTITUDES, TEACHER ATTITUDES, TEACHER CHARACTERISTICS, TEACHER MOTIVATION, *MEDICAL EVALUATION, *ACHIEVEMENT GAINS, COLLEGES, *INTERVIEWS, QUESTIONNAIRES, ANN ARBOR, MICHIGAN

WORK PRESSURES AMONG UNIVERSITY PROFESSORS INVOLVING QUANTITATIVE OVERLOAD AND QUALITATIVE OVERLOAD WERE STUDIED. MORE SPECIFICALLY, THE STUDY INVESTIGATED (1) THE EFFECTS OF OVERLOAD AND WORKLOAD ON JOB SATISFACTION, TENSION, AND SELF-ESTEEM, (2) THE EFFECTS OF THESE STATES ON CERTAIN INDICATORS OF HEALTH, AND (3) HOW THESE EFFECTS VARY WITH PERSONALITY CHARACTERISTICS. APPROXIMATELY 120 PROFESSORS WERE INTERVIEWED IN REGARD TO THEIR WORKLOAD, SELF-CONCEPT, AND SELF-ESTEEM. EACH PROFESSOR WAS ADMINISTERED A PERSONALITY TEST FOR ACHIEVEMENT, MOTIVATION, FLEXIBILITY, AND EXTRAVERSION AS WELL AS A THOROUGH MEDICAL EXAMINATION. CONCLUSIONS INDICATED THAT PROFESSORS AT A MAJOR UNIVERSITY (1) BELONG TO A HIGHLY PRIVILEGED GROUP, (2) ARE ABOVE AVERAGE IN HEALTH, (3) ARE IN A POSITION WHERE CONCERNS ABOUT MONEY HAVE MOVED FROM CONCERNS ABOUT NECESSITIES TO CONCERNS ABOUT AMENITIES, (4) HAVE NO COMPLAINTS ABOUT SOCIAL STATUS, AND (5) COMBINE FREEDOM AND INDEPENDENCE IN THEIR WORK WITH A FAIR DEGREE OF SECURITY AND EXTRINSIC REWARD. WHILE THE PUBLISH OR PERISH ISSUE IS A REALITY, IT IS LESS A DILEMMA THAN OTHER SOURCES HAVE INDICATED. DISADVANTAGES FOR THE GROUP SEEM TO BE THAT THE PROFESSOR'S FAMILY PAYS TO A CERTAIN EXTENT FOR HIS DEDICATION, AND THAT A GROUP WHICH SEEMS EXEMPLARLY EQUIPPED TO MAKE USE OF LEISURE DOES NOT HAVE IT. ALSO, IT WAS FOUND THAT GREATER SPECIFICITY IS NEEDED FOR SUCH CONCEPTS AS STRESS OR PRESSURE. THE PROBLEMS OF ACADEMIC ADMINISTRATORS SHOULD BE SEPARATED AS A GROUP FROM PROFESSORS WHOSE MAIN CONCERNS ARE RESEARCH AND TEACHING. (HB)

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

WORK LOAD OF UNIVERSITY PROFESSORS

Cooperative Research Project No. 2171

John R. P. French, Jr.

C. John Tupper

Ernst F. Mueller

Institute for Social Research
The University of Michigan
Ann Arbor, Michigan

1965

The research reported herein was supported by the Cooperative Research Program of the Office of Education, U. S. Department of Health, Education, and Welfare.

ED003329

PRECEDING PAGE BLANK-NOT FILMED

TABLE OF CONTENTS

Page

ACKNOWLEDGEMENTS ii

LIST OF TABLES v

LIST OF FIGURES. ix

LIST OF APPENDICES xi

CHAPTER

I. INTRODUCTION. 1

II. THEORY AND HYPOTHESES 4

An Exposition of Some Relevant Concepts of Self Identity Theory. 7
  The concept of identity dimension. 8
  The concept of performance dimension 9
  The concept of value scale 9
  The concept of self-esteem 10
Overload and its Effects 12
  The concept of quantitative and qualitative overload. 12
  The relationship between overload and occupational self-esteem. 18
  The relationship between status, overload and occupational self-esteem. 23
  The relationship between overload and number of work hours. 26
  The relationship between overload and achievement orientation 28
  The relationship between overload and cholesterol. 30
Achievement Orientation and its Relation to Serum Uric Acid. 32
The Relationship Between Achievement Orientation and Cholesterol. 35

III. METHOD AND MEASURES. 38

The Sample 38
The Source of the Data 38
The Data Gathering Procedure. 40
The Variables and Their Measurement 46
Status 47
Characteristics of the person 48
Variables of the psychological environment. 68
Variables measuring behavioral, attitudinal and physiological reactions. 75
Statistical Procedures. 84

IV. DESCRIPTION OF THE SAMPLE 87

Distribution of the sample by academic rank and by department 87
Distribution of the sample by age and marital status. 88
Attitudes toward work 91
Leisure patterns among professors 99

V. RESULTS: OVERLOAD AND ITS RELATION TO PSYCHOLOGICAL VARIABLES 102

The Relationship Between Overload, Subjective Public Esteem and Occupational Self-esteem.. 102
The Relationship Between Overload, Academic Status and Occupational Self-esteem. 113
The Relationship Between Overload and the Number of Work Hours. 120
The Relationship Between Overload and Achievement Orientation. 126

VI. RESULTS: FINDINGS CONCERNED WITH THE RELATIONSHIP OF PSYCHOLOGICAL AND PHYSIOLOGICAL VARIABLES. . . 134

The Relationship Between Overload and Cholesterol. 134
The Relationship Between Achievement Orientation and Serum Uric Acid. 136
The Relationship Between Achievement Orientation and Cholesterol. 137
Discussion of the Differential Relationship of Serum Uric Acid and Cholesterol with Achievement Orientation. 138

VII. SUMMARY, CONCLUSIONS, AND SUGGESTIONS. 144

Summary 144
Conclusions. 146
Suggestions. 147

APPENDIX. 149

LIST OF REFERENCES. 203

LIST OF TABLES

TABLE Page

1. Various sources of the data 39

2. Return rates of the data 39

3. Distribution of the dimensions most frequently used in the description of the job in a random subsample of 25 cases . . 43

4. List of the major variables used in the study 46

5. Correlations between the variables of the study and the K-scale of the MMPI 51

6. Mean serum uric acid levels as determined by the spectrophotometric uricase method for certain Caucasian populations 55

7. Mean values of serum uric acid levels in samples of differing social status 55

8. Mean serum uric acid levels distributed by status level . . 56

9. Interrater correlations and estimated reliability coefficients for the various subsamples 61

10. Mean values of achievement orientation scores distributed by status level 62

11. Mean values of the achievement orientation subscale scores distributed by status level 63

12. Correlations between the subscales and the total achievement orientation score, and intercorrelations among the subscales 65

13. Correlation between age and achievement orientation in the various status groups 67

14. Distribution of the mean values of the quantitative overload scores in the total group and in the various status groups 69

15. Distribution of the mean values of the qualitative overload scores in the total group and in the various status groups 70

16. Distribution of the mean values of the "self as a source of pressure" scores in the total group and in the various status groups 72

TABLE Page

17. Distribution of the mean values of the "perceived legitimacy" scores in the total group and in the various status groups 74

18. Distribution of the mean values of the "subjective public esteem" scores in the total group and in the various status groups 75

19. Distribution of the mean values of the "occupational self-estem" scores in the total group and in the various status groups 76

20. Distribution of the mean values of the work hour reports in the total group and in the various status groups, and correlations between the work hour estimates of the husband with those of the wife for the total group and the various status groups 78

21. Mean values of worry scores as reported by the professor, his worrying as reported by the wife, and correlation between husband and wife in the total group and in the various status groups 81

22. Comparison of the status distribution of the sample with the status distribution of the university as a whole 87

23. Distribution of the total group and the various status groups by department and scientific discipline 89

24. Age distribution of the sample and its various status subgroups, and age distribution at the University of Michigan in 1961-62 90

25. Distribution of status of the answers to the question: "In general, do you think that you are working hard or not very hard?" 91

26. Distribution by status of the answers to the question: "If by some chance you inherited enough money to live comfortably without working, do you think you would work anyway or not?" 92

27. Distribution by status of the answers to the question: "Why would you work?" 93

28. Reasons for continuing working (Morse and Weiss, 1955). . 95

29. Distribution by status of the answers to the question: "(If by some chance you inherited enough money to live comfortably without working), would you still keep doing the same type of work you are doing now?" 97

TABLE Page

30. Distribution by status of the answers to the question: "Could you tell me specifically what are the things you like about your job?" 98

31. Distribution by status of the answers to the question: "When your husband comes home what are some of the ways in which he relaxes?" 100

32. Distribution by status of the answers to the question: "Could you please tell us how your husband usually spends his weekends?" 100

33. Correlation between overload, subjective public esteem, and occupational self-esteem 103

34. Correlation between quantitative overload and occupational self-esteem among professors and among administrators 107

35. Correlation between qualitative overload and subjective public esteem among professors and among administrators 107

36. Correlation between overload and occupational self-esteem among administrators 108

37. Correlation between overload and occupational self-esteem among professors, excluding administrators 110

38. Correlation among status, overload, subjective public esteem, and occupational self-esteem among professors, excluding administrators 114

39. Correlation of age and quantitative overload in the various status groups 117

40. Correlation between overload and work hour estimates, as reported by the professors and their wives 120

41. Correlation between overload and perceived legitimacy of pressure 121

42. Correlation between the work hour estimates of the professors and their wives and the degree of perceived legitimacy of pressure 122

43. Correlation between quantitative overload and achievement orientation among professors and among administrators 126

44. Correlation between overload and achievement orientation among professors, excluding administrators 129

TABLE Page

45. Correlation between overload and the seven subscales of the achievement orientation index among professors, excluding administrators 130

46. Correlation between cholesterol and overload 135

47. Correlation between serum uric acid, achievement orientation index, and the seven subscales of this index . . 136

48. Correlation between cholesterol, achievement orientation index, and the seven subscales of this index 138

49. Differences in the correlations between achievement orientation index, its subscales, and serum uric acid and cholesterol, respectively 139

50. Differences in the correlations of serum uric acid and cholesterol with the worry index (wife reporting) 141

LIST OF FIGURES

Figure		Page
1.	Diagram of the major relationships considered in this study.	4
2.	Identity dimension and its corresponding performance dimension and value scale which graphically represent the definition of overload.	17
3.	Theoretical model illustrating the relationships among objective overload (OOL), communicated objective overload (COL), subjective overload (SOL), and occupational self-esteem (OSE) on the one hand, and objective public esteem (OPE), communicated public esteem (COPE), subjective public esteem (SPE), and occupational self-esteem (OSE) on the other hand.	19
4.	Theoretical model diagramming the relationships between objective overload (OOL), status conceived of as objective public esteem (OPE), communicated overload (COL), communicated public esteem (COPE), subjective overload (SOE), subjective public esteem (SPE) with occupational self-esteem.	25
5.	Diagram representing the two aspects of defensive distortion.	49
6.	Correlogram presenting the network of relationships among the variables: quantitative overload, qualitative overload, subjective public esteem, and occupational self-esteem.	102
7.	Correlogram presenting the relationships among overload, subjective public esteem, and occupational self-esteem in professors excluding administrators.	106
8.	Correlogram presenting the relationship among overload, subjective public esteem, and occupational self-esteem in the group of administrators.	106
9.	Correlogram showing the relations between status, overload, subjective public esteem, and occupational self-esteem in the group of professors excluding administrators.	114

Figure Page

10. Correlogram of the relationships among the variables overload, legitimacy of pressure, and the work hour estimates of the husband and his wife. 123

11. Correlogram showing the relationships between qualitative overload, perceived legitimacy of pressure and self as a source of pressure among professors, excluding administrators. 132

APPENDICES

A. FORM LETTER INVITING THE PROFESSOR TO PARTICIPATE IN THE STUDY 149

B. INTERVIEW AND INTERVIEW RELATED CARDS. 151

C. LETTER REMINDING THE PROFESSOR TO RETURN THE SELF-ADMINISTERED QUESTIONNAIRES 164

D. LETTER INVITING THE WIFE TO PARTICIPATE IN THE STUDY. . . . 166

E. LETTER THANKING THE PROFESSOR FOR HIS COOPERATION. 168

F. THE ITEMS OF THE K-SCALE OF THE MMPI 170

G. CODING INSTRUCTIONS FOR THE SUBSCALES OF THE ACHIEVEMENT ORIENTATION MEASURE 172

H. INTERRATER CORRELATION AND ESTIMATED RELIABILITY OF THE SEVEN SUBSCALES OF THE ACHIEVEMENT ORIENTATION MEASURE. . 181

I. FACTOR LOADING OF THE ITEMS COMPOSING THE TWO OVERLOAD SCALES 182

J. QUESTIONNAIRE FORM USED TO ASSESS THE DEGREE TO WHICH THE SELF IS SEEN AS THE FOREMOST SOURCE OF PRESSURE 183

K. QUESTIONNAIRE FORM USED TO ASSESS THE PERCEIVED LEGITIMACY OF THE PRESSURE. 184

L. QUESTIONNAIRE FORM USED TO ASSESS THE DEGREE OF SUBJECTIVE PUBLIC ESTEEM 185

M. QUESTIONNAIRE FORM USED TO ASSESS THE DEGREE OF OCCUPATIONAL SELF-ESTEEM. 186

N. CODING CATEGORIES FOR THE CLASSIFICATION OF THE VARIOUS DEPARTMENTS 187

O. CODING CATEGORIES FOR THE ANSWERS TO THE QUESTION: "IN GENERAL, WOULD YOU SAY THAT YOU WORK HARD OR NOT VERY HARD?". 188

P. CODING CATEGORIES FOR THE ANSWERS TO THE QUESTION: "WHY WOULD YOU WORK (IF YOU DIDN'T HAVE TO)?". 189

Q. CODING CATEGORIES FOR THE ANSWERS TO THE QUESTION: "COULD YOU TELL ME SPECIFICALLY WHAT ARE THE THINGS YOU LIKE ABOUT YOUR JOB?". 192

R. CODING CATEGORIES FOR THE ANSWERS TO THE QUESTIONS ASKED OF THE WIFE ABOUT THE LEISURE TIME ACTIVITIES OF THE HUSBAND. 196

S. CORRELATION OF ACHIEVEMENT ORIENTATION AND SERUM URIC ACID IN THE FOUR STATUS GROUPS. 199

T. ITEMS AND INSTRUCTIONS OF THE WORRY INDEX. 200

U. INTERCORRELATION MATRIX OF THE VARIABLES USED IN THIS STUDY, NOT CORRECTED FOR DEFENSIVENESS 201

V. INTERCORRELATION MATRIX OF ALL THE VARIABLES USED IN THIS STUDY, CORRECTED FOR DEFENSIVENESS. 202

W. SELF-ACTUALIZATION, OVERLOAD, AND HEALTH: A THEORETICAL APPROACH

X. THE RELATION OF SERUM URATE LEVELS TO DRIVE, ACHIEVEMENT AND LEADERSHIP IN UNIVERSITY PROFESSORS

CHAPTER I

INTRODUCTION

This is a study of two kinds of work pressures among university professors: (a) quantitative overload, the pressure which arises from having too much to do, and (b) qualitative overload, the pressure which arises from not being able to do what one is supposed to do.

More specifically, the study tries to show first how these pressures relate to status, to psychological reactions, and to indices of a person's physiological state. Secondly, we will try to establish that achievement orientation, a characteristic of the person which is related to work pressure, is also correlated with a person's serum uric acid level, a physiological variable. And finally, we hope to demonstrate that behavioral and emotional reactions that are related to serum uric acid are different from those emotional and behavioral reactions which are related to elevated serum cholesterol levels.

Why study such problems among professors? We believe that the role of higher education has gained in importance. The technological development of this society, and the increase in population with the resulting pressure for college admission, have made it essential that we know more about the professor and his problems. Academic organization and financing are no doubt of similar importance. But it is the professor who carries the main burden of the perpetuation and advancement of learning; it is he who carries on research, and who teaches both his own successors as well as those who will apply his knowledge.

The literature on professors contains two works which provided ideas, background, and perspective for this study, although none of them deals with overload specifically. The first is Wilson's The Academic Man. (1942) Wilson was concerned with the effects of the university organization on the attitudes and the behavior of university professors. He dealt with such problems of the academic profession as status, the function of academic men, and variables that are important in the qualification, recruitment, and placement of professors in the academic community. His conclusions are based on personal experiences and on a review of the literature up to 1942.

The second book, Caplow and McGee's The Academic Marketplace (1958), was an attempt to analyze the selection and the replacement of faculty members in major institutions. This analysis relates the career pattern of the individual to the present structure of his university, and places the local academic community within the wider academic market. It is basically an analysis of faculty mobility; the major part of the book is concerned with the recruitment process. The findings of the book were based on open-ended interviews conducted with members of 215 liberal arts departments in nine major universities having vacancies and replacements in the academic years 1954-1956. Among those interviewed were faculty, department heads, candidates for the vacant positions (successful and unsuccessful), and in some instances university deans and presidents.

Surprisingly few studies have used face-to-face contact between researcher and respondent as a method of investigation. But especially in the study of professors is this of importance. A great number of professors are highly reluctant to fill out questionnaires. This point was just recently emphasized in Austin's thesis (1965) which dealt with the determinants of occupational choice in the academic realm. To express themselves within the confines of predetermined and never exactly fitting categories is not to their liking. Moreover, they see their time as so valuable that they are not inclined to spend it on research of others unless they are reasonably sure that it is worthwhile. Face-to-face interaction seems a better way of coping with these obstacles than just a letter which tries to introduce a study. Professors like to talk, they like to feel that their views are given a chance for expression, they themselves like to be in control of a situation. It is, thus, a good idea to include face-to-face interaction into any study of professors.

On the other hand, structured questionnaires eliminate a great number of problems of comparability and standardization. In many ways it is also more efficient to let the person complete a questionnaire than to lengthen an interview unduly. Thus we feel that the combination of face-to-face interaction followed by structured questionnaires is an improvement over the use of either method alone.

No study has so far come to our attention which relates variables of the academic environment to physiological variables. In including such variables in this study we feel that we are exploring a still relatively uncharted area of relationships. In the next chapter we shall begin by setting forth the theory underlying this study, and by giving a rationale for the hypotheses which are tested in our study.

CHAPTER TWO

THEORY AND HYPOTHESES

This study is part of a larger program which tries to link personality factors and characteristics of the social environment to physical and mental health. The basic theoretical approach of this program is set forth in an article by French and Kahn (1962). It postulates the interdependence among the objective social environment, the environment as it is perceived by the person, that person's personality characteristics, and his behavioral and physiological reactions. The approach relies heavily on the theory of self-identity as developed by D. R. Miller (1963). A diagram may show how the main variables of this study might fit into this larger scheme.

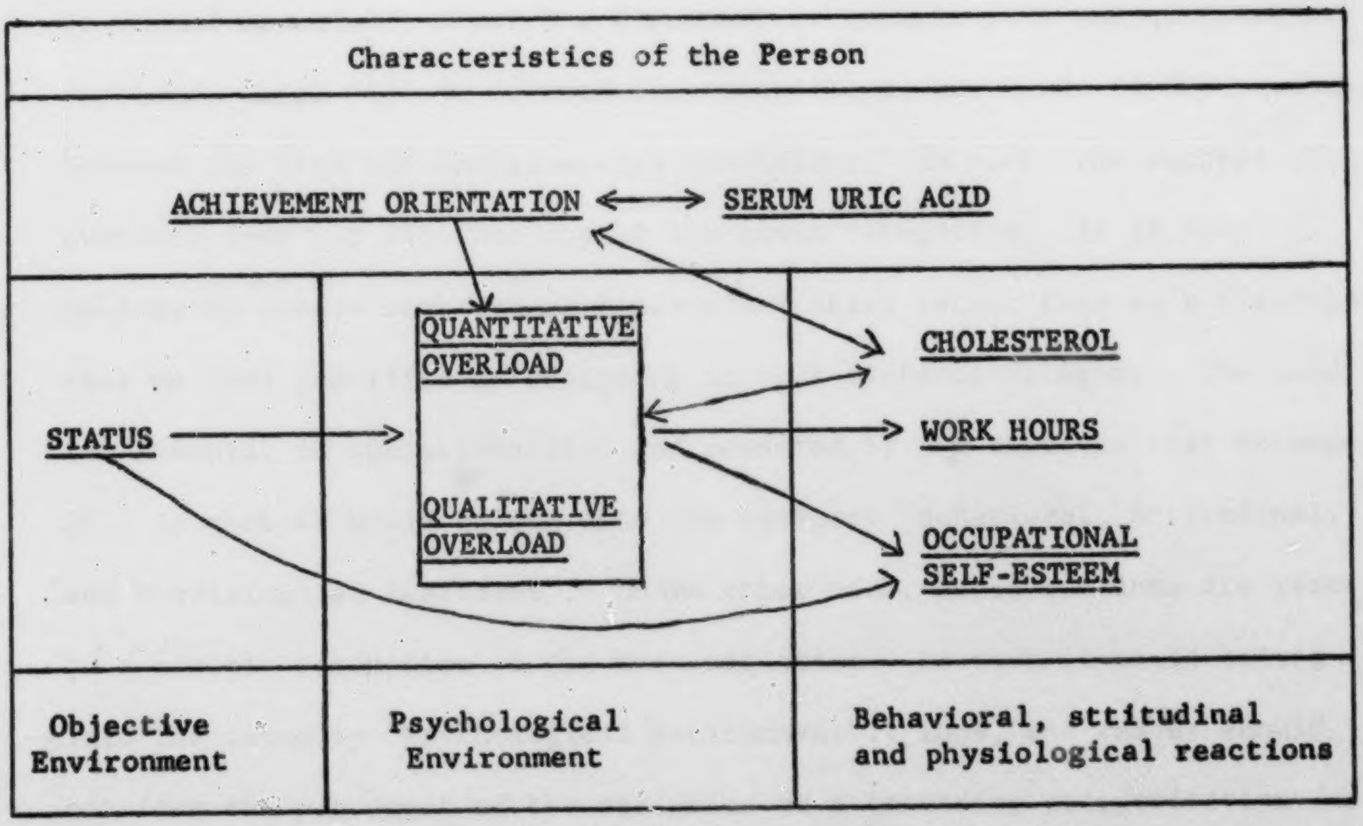
Characteristics of the Person
ACHIEVEMENT ORIENTATION
SERUM URIC ACID
QUANTITATIVE OVERLOAD
QUALITATIVE OVERLOAD
STATUS
CHOLESTEROL
WORK HOURS
OCCUPATIONAL SELF-ESTEEM
Objective Environment
Psychological Environment
Behavioral, sttitudinal and physiological reactions

Fig. 1: Diagram of the major relationships considered in this study. The arrows indicate assumed causal relationships. Arrows pointing in two directions indicate parallelism rather than assumed causality.

The arrows in Fig. 1 represent assumed causal relationship. In our theoretical discussion we will give the rationale for the causal inferences. Since we consider the hypotheses as part of the theory, they too will be stated in causal form. The analysis of the data, however, is based on correlations which do not justify causal interpretations. Therefore, in the presentation of the data we distinguish between hypotheses and empirical predictions. The empirical predictions are stated without references to causal directions. We shall leave it up to the reader to decide to what extent he is willing to consider the data as support of the theoretical--causally stated--hypotheses.

With respect to the diagram above, questions may arise as to why a variable has been placed into a given category. Such questions may be raised especially about the placement of quantitative and qualitative overload--which will be defined theoretically as two kinds of discrepancies between the self and environmental conditions. As such, the concept of overload does not fit into any of the given categories. It is only because we assess overload as a perceived state rather than as a discrepancy that we feel justified in assigning it to a distinct category. Overload, for example, is operationalized and measured by the emotions that accompany it. As such it would belong into the category "Behavioral, Attitudinal, and Physiological Reactions". On the other hand, these emotions are reactions to a certain perception of the work situation. As such it would belong into the category "Psychological Environment". Thus, the reader should consider the placement of the variables as a tentative categorization for illustrative purposes.

The variables included in the preceding diagram are those which we intend to link theoretically in the way indicated by the arrows. Besides these there are a number of other variables which may help us in the understanding and the discussion of the results but which are outside the focus of this study. These variables are: (a) defensiveness, (b) source of pressure, (c) legitimacy of pressure, (d) subjective public esteem, (e) job worry, (f) blood pressure, and (g) obesity. All measures will be discussed in the section on methodology.

We shall break the theoretical discussion down into four problem areas: (a) a discussion of the relevant concepts of self-identity theory; (b) the concepts of qualitative and quantitative overload and their relationships; (c) serum uric acid and achievement orientation; and (d) achievement orientation and cholesterol. In each section we shall define the concepts, state the theory, and present the rationale for the hypotheses. As said before, in this chapter we shall state the hypotheses causally and in terms of the theory. Later, in chapters V and VI, after describing the methods, the operationalizations of the concepts, and the sample, we will present the empirical predictions used to test the hypotheses.

Before going into the theoretical discussion it might be useful to state what this study is not. It is only in part a survey of objectively existing conditions. Frequently we are dealing only with a person's perception of his work situation. These perceptions are anchored to status on the one side, and physiological variables on the other. But for the rest we have to rely on statements made by the person himself. Thus, the information on overload and on self-esteem, for example, comes from the same person. This means that our measures are not independent of each other.

We recognize the limitations this puts on the interpretation of the data, but in the present study an independent assessment of all the variables was not possible: it would have been too costly in terms of time and money and it is also doubtful that we could have gotten positive cooperation from our subjects, for an approach which would have involved among other things, the interviewing of superiors and co-workers.

Nor is this an action-oriented study. It will hardly yield recommendations for an administrator. Finally, the focus of this study is not the University of Michigan as such, but only in so far as the university provided the particular setting in which to test derivations from a theory. We hope that the results are only in insignificant ways determined by the special conditions pertaining only to this institution, except in the sense that the University of Michigan is in the "major league" and that our conclusions might be different had we studied men in the "bush league" or in "academic Siberia" (Caplow and McGee, 1958, p. 18). We would hope that our findings could be generalized beyond this one university to professors in all institutions that are considered major universities.

An exposition of some relevant concepts of self-identity theory

Since the theory to which the concepts of work overload will be linked is that of self-identity theory, we shall start by discussing some of its aspects, relying on the work of D. R. Miller (1963), and French and Sherwood (1963).

The person builds and develops a picture of the self from his continous interaction with the physical and especially the social environment. It is the concepts developed in this process of interaction which provide the individual with the frame of reference for perceiving himself. This view of the self was introduced into the social sciences by Cooley (1909, 1922), and Mead (1934, 1956). In 1943, G. W. Allport surveyed the literature on the self concept, and Ruth Wylie published a critical review of the existing research studies in 1961. During the last years the problem of the self has been taken up at the University of Michigan mainly by Professors Daniel R. Miller and John R. P. French, Jr. The following concepts of their work seem relevant to an understanding of this study.

The Concept of Identity Dimension

The first concept of self-identity theory that is relevant to our subsequent discussion of overload is the concept of identity dimension. We regard an identity dimension as a set of alternatively possible attributes which are treated by the person as constituting a roughly linear scale, all having a common core of meaning but varying in degree. According to its degree, the attribute is assigned a location on the dimension.

A self-attribute is the location a person assigns to himself on a single dimension. An identity dimension is any human characteristic which can be ordered and scaled; for example, honesty, intelligence, strength, etc.[1]

---

[1] It shall be mentioned here that probably not all human attributes can be defined as positions along a given dimension. French and Sherwood (1963) operate therefore with the concept of 'primary subset', a structure of mutually interdependent attributes which are not necessarily ordered along a uni-dimensional scale. However, abilities and skills can be brought into such a uni-dimensional rank-ordering and since in our investigation we are mainly concerned with abilities and skills, we will continue to speak of dimensions.

The Concept of Performance Dimension

How are identity dimensions built up? How does the person develop the conception of a dimension "intelligence" which can be used in the description of his self? These dimensions develop out of the person's interaction with his environment; his self-attributes are the result of repeated performances in related situations. Self-attributes develop out of behavior. The dimensions along which these behavior acts can be ordered are defined as performance dimensions. We assume that for all abilities whose existence is inferred from performance, and for all behavioral traits which are defined in terms of typical performance levels, there exist performance dimensions which correspond to identity dimensions. For example, various dimensions of job performance such as typing speed, and various dimensions of moral and ethical behavior, will have corresponding identity dimensions such as typing ability or generosity and aggressiveness.

The Concept of Value Scale

Once an identity dimension has developed, how is it judged, how is it evaluated? Evaluation comes from the assumption that each identity dimension has its corresponding value scale. A value scale is the uni-dimensional ordering of a value corresponding to an identity dimension. The value scale provides the basis for the person's evaluation of his own attributes, and of the attributes of others. A person is positively valued if his attributes are attractive to the evaluator and negatively valued if his attributes are repulsive to the evaluator. The concept of a 'value scale' should be distinguished from the concept of 'value standard'. French and Kahn (1962) define this difference as follows:

> A seventh conceptual property [of motives] should be useful in describing varying standards for the evaluation of self and others. For example, knowledge is a good thing, but the amount of knowledge evaluated by P as "very good" will differ depending on whether O is a young child, a high school student, or a college student. We may conceptualize such value standards as the relation between the self-identity dimension (e.g., amount of knowledge) and the value scale (i.e., how good or bad it is). Thus, value standards will often shift with a change in the O's to whom the value is applied. (1962, p. 15)

The Concept of Self-esteem

The evaluation of a single self-attribute on a value scale corresponding to an identity dimension is one determinant of a person's self-esteem. Total self-esteem is defined as the evaluation of the totality of a person's self-attributes with each attribute weighted according to its importance for total self-evaluation.

We said earlier that self-attributes are developed out of the person's interaction with his physical and social environment. As Murphy (1958) expresses it "a person learns through his relations to others where he belongs, who, and what he is." There are, of course, situations in which no social confirmation is needed to know whether one has or has not a certain self-attribute. If a heavy stone lies in my way and I move it, then I don't need society to tell me my self-attribute along the dimension of 'weight-lifting.' But with my position along a dimension such as 'research ability,' it is different. What constitutes research ability or the lack of it is socially determined. The person learns that he possesses a medium level of research ability because the relevant others in his environment have repeatedly labelled his behavior as corresponding to a medium level of research ability. We follow Festinger (1954) when we assume that the dependence on the social environment for the determination of one's self-attributes is a function of the lack of 'physical reality'.

But even if a person validates a self-attribute without reference to society, as for example the ability to lift a 100 lb. stone, he still does not know how to evaluate this ability. Is the ability to lift 100 pounds good, bad, or average? To answer this question he has to ask others, or he has to compare his strength with the strength of others of the same age and sex, unless he restricts the evaluation to his survival needs. Thus, the evaluation of an attribute is strongly tied to the norms of social groups.

In this study we are interested not in the person's total self-esteem but only in his occupational self-esteem. We define occupational self-esteem as the evaluation of attributes of the occupational sub-identity. A sub-identity is defined as the totality of identity dimensions which corresponds to the requirements of a social role or a social category. A further discussion of the concept of sub-identity and of relevant literature can be found in the work by Sherwood (1962). Such a specification as to the sub-identity we are dealing with is necessary in order to avoid the confounding effects of compensation. As French and Sherwood (1963) point out, the person's self-evaluation is a function of the person's self-attribute evaluation, weighted by the importance of those self-attributes for self-esteem. Increasing the importance of a dimension of high self-evaluation is a means of raising one's self-esteem. High self-evaluation as a father, for example, could conceivably offset and counteract the effects of low occupational self-esteem. For this reason we make it a point to assess occupational self-esteem as distinguished from total self-esteem.

Overload and Its Effects

The Concepts of Qualitative and Quantitative Overload

The concept of overload is neither a purely psychological concept as for instance 'intelligence', nor is it a purely sociological concept such as 'class'. Overload holds a position in between. It is a concept which tries to define the correspondence between person and environment. While the character of a social class may be influenced by psychological factors, the concept of 'class' as a common position in the market situation can nevertheless be understood independently of these conditioning human factors. Similarly, we know that sociological factors have a relation to intelligence. For an understanding of the concept of intelligence as the ability to solve problems, the consideration of these variables is not necessary. But neither the knowledge of a man's abilities, nor our knowledge of the environmental opportunities alone allows us to say whether a person is overloaded or not. Only if we set these conditions in relation to each other, can we speak of overload.

For the purposes of this study overload is defined as the perceived discrepancy between a state of the person and the demands of the environmental situation.[2] We distinguish between two such discrepancies. One is the discrepancy between a person's preferred use of an ability and the required use of an ability; the other is the discrepancy between a person's own degree of ability and the required degree of ability. We call the one 'quantitative overload', and the other 'qualitative overload'.

---

[2] This is not meant to negate the possibility that denied overload can nevertheless affect a person's psychological reactions negatively. To explain some properties of the self and some effects of overload it is useful to assume 'unconscious perception,' a term which applies to responses that a person cannot report, which the observer, however, can infer from independent evidence such as GSR, or slips of the tongue, and which are predictably associated with specified behavior. Thus, the concept of overload includes the relationship between what Hilgard (1949) has called the "inferred self" and environmental conditions. However, in this study we are dealing only with the relationship between the consciously perceived aspects of the self and environmental conditions.

Qualitative Overload

In the pure case, qualitative overload exists when a single demand by relevant others requires a higher degree of skill or talent for its execution than the person possesses. Even if the person devoted all of his time to the fulfillment of that one demand, he could not do it. In this sense, every human being is potentially exposed to qualitative overload, since there are always demands others could make which would exceed one's abilities. However, such a discrepancy becomes psychologically relevant only if it occurs with respect to a dimension which is part of the self and with respect to demands which are considered legitimate. For example, it is demanded of an interpreter at the UN that he translate what is said while it is being said. I could not do this. But, on the other hand, I don't have a self-identity dimension of 'being an interpreter', nor do I have the job of an interpreter. Thus, the discrepancy between my skill level and the job demand does not face me. In this respect, I am not under qualitative overload, because the dimension in question is not part of the self, and because relevant others don't make any demands on me in this respect. On the other hand, if a researcher who knows how to handle a desk calculator and for whom correct and efficient data analysis is part of his occupational self is suddenly by relevant others placed in front of a high speed computer, then we do have a psychologically relevant discrepancy and speak of qualitative overload. Thus, the concept of qualitative overload can be restated by saying that qualitative overload is the existence of a discrepancy between a self-attribute and a performance attribute required by relevant others.

It must be pointed out that the agent posing the demand can be the external environment, i.e., the chairman, the profession, and so forth. But the person's own self can also formulate the demand. We assume that not living up to external demands and not living up to one's own demands both create qualitative overload.

Quantitative Overload

In the pure case or in the laboratory situation, the concept of quantitative overload is similar to J. G. Miller's (1960) concept of 'information input overload'. Each and every demand is reasonable and compatible with other demands, but in combination and accumulation they cannot be handled in the given unit of time. This could happen to the most skilled and most efficient switchboard operator. The lady may be able to handle all kinds of calls correctly, but at a certain time so many calls may come in simultaneously that she is unable to handle them all equally well.

While this may describe the pure case, the conditions in the actual job situation are different. Here, we hardly ever deal with a single skill or ability. Even on the assembly line there is practically no job which requires day in, day out for eight hours the use of the same skill. And certainly the job of a professor does not consist of using just one skill. Besides, we make the assumption that in a job situation like that of a professor the demands never reach a level where differences in skill and efficiency become immaterial.

What leads to quantitative overload for a professor is the fact that his preference for certain activities, their psychological weighing, does not coincide with the required weighing of these skills on the job. Let us look as an example at a good secretary. Let us assume that the lady loves her typewriter. It is nevertheless improbable that she loves only the typewriter. She may love the boss too. If, now, her job requires her to type all the time and if it does not give her also the possibility to make coffee for the boss, then we will have to say that she is overloaded with typing even though, basically, she likes typing. The point at which the use of an attractive skill becomes overloading has to be determined individually for each person according to the psychological weighing he assigns to a given dimension in relation to others. The psychological weight of the dimension will find some expression in the amount of time the person is willing to devote to a given activity. If a secretary finds typing for her occupational self-utilization more important than, let us say, half of all the other skills required on the job, then she will consider herself utilized if she can spend 50% of her working time at the typewriter. However, if she is forced to type 75% of the time, then she will feel overloaded. At the same time, in persons who live a full life, the correlate of this overload on one dimension implies the under-utilization of some other dimension. The time which the secretary spends 'too long' at the machine has to come from somewhere and a person who lives fully does not have unnecessary waste-time in his daily life. (To say that the secretary might work more intensively is no solution since it is our assumption that working above one's preferred level of intensity leads to feelings of overload in the same way as working beyond one's preferred time allotment. In this study we are leaving 'intensity' out of our considerations because of the difficulties in operationalizing this concept.) We define quantitative overload as the discrepancy between the preferred use of an ability which is part of the occupational self and the more extensive use required by the job situation.

Conceptually, and in the case of a single dimension, the distinction between quantitative and qualitative overload seems clear enough. But the fact that an occupation requires the use of more than one dimension complicates the picture, and the distinction becomes difficult. A professor who turns out shoddy research may say that this is not due to his lack of ability but due to the fact that he has so much else to do. But in contrast to this it may be that just because he does not have the ability--for concentrated and efficient work, let us say--that he gets into a situation of quantitative overload. Thus we do have an empirical interdependence: Lack of ability leads to quantitative overload, and quantitative overload leads to sub-standard performance.

Hypothesis 1: When more than one dimension is involved qualitative overload and quantitative overload will mutually influence each other, in that lack of ability may lead to quantitative overload and in that quantitative overload may lead to a deterioration in performance.

The fact that we recognize the interdependence of the two kinds of overload does not mean that we consider them identical. It is one of the basic statements of this study that qualitative and quantitative overload will relate differentially to such variables as status or self-esteem. The question becomes one of operationalization. Can we assess that part of the variance in each concept which is not common to both of them?

We decided to attempt such an operationalization of the concepts by trying to assess the emotional feelings which accompany each discrepancy. We do not claim that these emotional feelings are totally different from each other. As stated above, we do expect an association, but we felt that we could best get at the specific variance of quantitative overload by trying to measure the feeling "I could do it, but there is just too much of it." Qualitative overload we see as accompanied by the feeling of "I cannot do it; I cannot live up to the demands." Thus operationally, we are not assessing the discrepancies but the feelings that are assumed to accompany these discrepancies.

It is these two concepts and their relationships which mainly interest us in this study. The following illustration might help to clarify them.

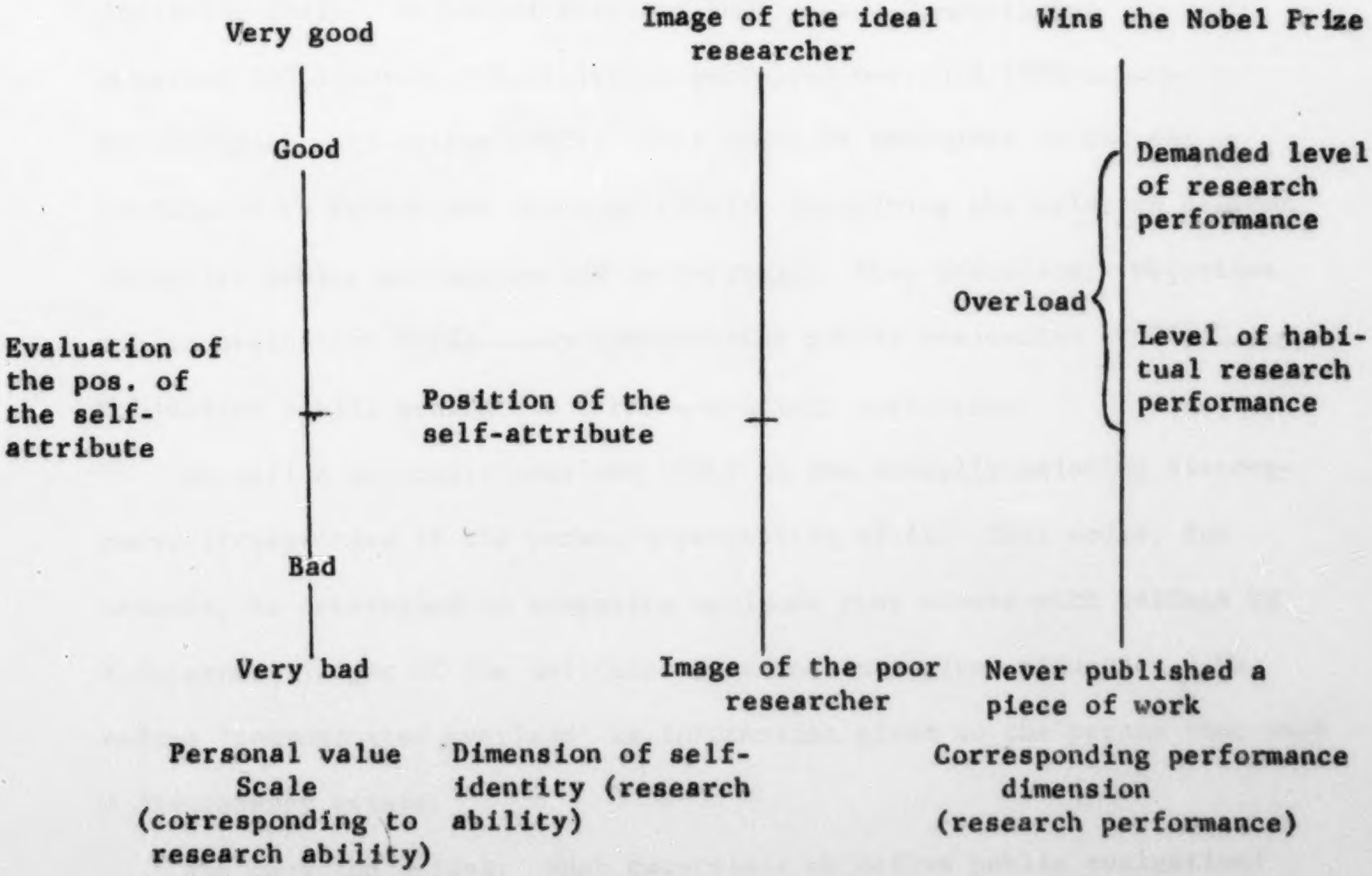
Very good
Good
Evaluation of the pos. of the self-attribute
Bad
Very bad
Personal value Scale (corresponding to research ability)
Image of the ideal researcher
Position of the self-attribute
Image of the poor researcher
Dimension of self-identity (research ability)
Wins the Nobel Prize
Demanded level of research performance
Overload
Level of habitual research performance
Never published a piece of work
Corresponding performance dimension (research performance)

Fig. 2.- Identity dimension and its corresponding performance dimension and value scale which graphically represent the definition of overload.

The Relationship between Overload and Occupational Self-esteem

We start out by assuming that a person's occupational self-esteem which is the evaluation of his self-attributes is influenced by the way in which the person performs his job, i.e., by the correspondence between his self-attributes as demonstrated in performance and the required performance attributes. The discrepancy between self-attributes and required performance attributes was defined as overload whenever the required performance attributes exceeded the level of a person's self-attributes so that the resulting performance was inadequate. But this effect of overload on occupational self-esteem goes through several steps. A number of variables mediate this process. We postulate the following chain: Objective overload (OOL)———> Communicated overload (COL)———> Subjective or perceived overload (SOL)———> Occupational self-esteem (OSE). This chain is analogous to the one postulated by French and Sherwood (1963), describing the relation between objective public evaluation and self-esteem. They postulate: Objective public evaluation (OPE)———> Communicated public evaluation (COPE)———> Subjective public evaluation (SPE)———> Self evaluation.

We define objective overload (OOL) as the actually existing discrepancy, irrespective of the person's perception of it. This could, for example, be determined by comparing aptitude test scores with ratings by independent judges of the aptitudes required in a given situation. We define 'communicated overload' as information given to the person that such a discrepancy exists.

The question arises: What determines objective public evaluation? In the occupational realm we assume that overload, the discrepancy between actual and required performance, is a major determinant. Thus we assume the following theoretical model:

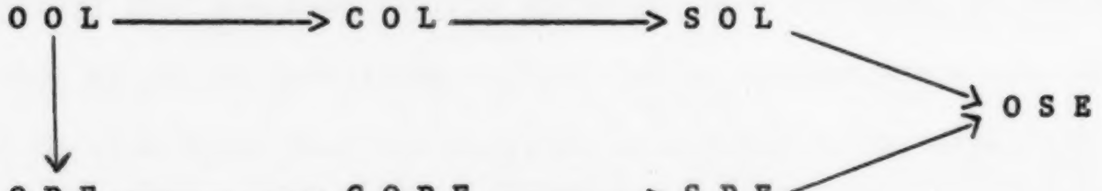

Fig. 3: Theoretical model illustrating the relationship among objective overload, (OOL), communicated objective overload (COL), subjective overload (SOL), and occupational self-esteem (OSE) on the one hand, and objective public esteem (OPE), communicated public esteem (COPE), subjective public esteem (SPE), and occupational self-esteem (OSE) on the other hand.

In the present study we do not deal with all links in the chain, but it is in the framework of this model that the following discussion should be understood. What the model says is that overload affects a person's self-esteem in two ways, directly via his perception of the communicated overload, and indirectly via the evaluation of this overload by relevant others.

Theoretically, a communication about overload is not the same as a communication about public esteem. Empirically, however, the two are likely to be related as, for example, in the appraisal interviews in industry. A communication about overload will likely be perceived as an expression of low public esteem, and an expression of low public esteem is likely to be seen as a result of existing overload.

Quantitative overload and occupational self-esteem

It is the basic contention of this study that the two kinds of overload will have different effects in spite of their interdependence because they differ in their relation to a person's self-identity. In order to understand the relation between quantitative overload and occupational self-esteem, we proceed on the assumption that how well a professor performs various activities will be more important for his evaluation by relevant others than how much time he spends on each activity. A professor may know that he is not fulfilling all his duties because there are too many. But he also knows that his relevant others are in the same situation. There may be a discrepancy between performance requirements and self-attributes, but the person knows that such a discrepancy is the norm. It may even be that the professor is proud to be involved in so many activities that he has too much to do to fulfill all his obligations. The discrepancy is only quantitative, and we assumed that quantity is less important for his evaluation by others than is quality.

Hypothesis 2a: Qualitative overload affects a professor's public evaluation more negatively than does quantitative overload.

Another variable that will affect the relationship between quantitative overload and occupational self-esteem is the perceived legitimacy of the demands. Occupational self-esteem will be influenced by quantitative overload only to the extent that the job demands are considered legitimate so that the person feels he ought to do all that work. We hypothesize that quantitative overload will be negatively related to the perceived legitimacy of the pressure. The rationale for this hypothesis is the following. We know that professors place a great value on having control over their job, as well as freedom, and independence in it. Quantitative overload means that there is too much to do and this prevents complete control over the distribution of activities, which reduces the feeling of freedom and independence, which he feels he should have.

Hypothesis 2b: Quantitative overload is negatively related to the perceived legitimacy of the pressure.

The above reasoning suggests that any negative relationship that might exist between quantitative overload and occupational self-esteem will be reduced in strength when we consider the conditioning effect of the degree of perceived legitimacy of pressure.

Hypothesis 2c: The strength of the relationship between quantitative overload and occupational self-esteem will be reduced to the extent that overload is considered illegitimate.

We said earlier that self-attribute evaluation is an evaluation of the position of the self-attribute along an identity dimension weighted by the importance of that dimension. We also assumed that quantity would be less important than quality of performance. Thus, qualitative overload should affect occupational self-esteem more strongly than quantitative overload. We predict, therefore, that the relationship between quantitative overload and occupational self-esteem will be weaker than the relationship between qualitative overload and occupational self-esteem.

Hypothesis 2d: The relationship between quantitative overload and occupational self-esteem will be weaker than the relationship between qualitative overload and occupational self-esteem.

We do not feel that we can make a more confident prediction about the relationship between quantitative overload and occupational self-esteem, since the ability to perform a task and the amount performed are assumed to be related.

Qualitative Overload and Occupational Self-esteem

Qualitative overload in contrast to quantitative overload implies a consistently low performance, i.e., the perception of a low performance attribute relative to the required performance attribute with respect to aspects of the job--qualitative aspects--that are important to the person. Thus, we predict that qualitative overload will lead to, or implies, low occupational self-esteem.

Hypothesis 2e: Qualitative overload will lead to, or implies, low occupational self-esteem.

It is certainly true that different reference groups are involved in the definition of what represents a 'required performance.' A professor might be considered as creative with reference to his profession but he is still pushed to greater heights to improve the image of the university, let us say. Thus, a man for whom the profession is the more salient reference group might still experience qualitative overload as defined by the institution as a reference group, but this qualitative overload will affect his self-esteem less since the institution is less salient as a reference group when compared with the profession.

We were aware of the possible conditioning effects of reference group salience on this relationship. However, the questionnaire which tried to assess reference group salience was not filled out properly by such a great number of professors that the construction of a meaningful index was not possible. Thus we have to be content in the present study with the admittedly oversimplified hypothesis stated above.

The Relationship between Status, Overload, and Occupational Self-Esteem

It is reasonable to think that a person's occupational status will be related to the overload he experiences. But why? The answer will depend on what 'status' means to the person. The work of Kasl and French (1962) deals with relationships between status and occupational self-esteem. They find that people agree well in their status rankings of various job positions, and that these rankings form the basis for the attribution of certain characteristics to the occupants of these job positions. Therefore, "occupants of high status jobs will have a favorable objective public identity, that is high objective public esteem. Objective public esteem largely determines subjective public esteem which in turn strongly affects self-esteem" (1962, p. 76).

They also find that the job occupants attribute the characteristics associated with a given job position to themselves. Therefore, "the occupant of a high status job will also tend to have a favorable self-concept; that is he will have high self-esteem because he will tend to perceive himself in the more highly valued regions of his self-dimension (1962, p. 76). Kasl and French use the following illustration:

> Suppose that for a person who works for a company manufacturing electronic equipment, knowledge of electronics has become an important dimension of his occupational sub-identity. Suppose, moreover, that 'extensive knowledge of electronics' is evaluated highly and that 'little knowledge of electronics' is evaluated very lowly. This value scale is shared by other employees of the company. If he is unable to advance beyond a job which requires only minimal knowledge of electronics, then his present job is a constant reminder that he in fact lacks extensive knowledge. The job forces him (baring distortions and other defenses) to perceive his position on the identity dimension below that position which he evaluates as 'good' or 'satisfactory'. He consequently experiences low self-esteem with respect to that dimension. (1962, p. 76).

We infer from this, two meanings of status for the person. Status means 'objective public esteem'. But secondly, status provides direct feedback to the person about how good he is in his chosen profession. It is a communication about how well the person's abilities fit the demands of the job. It is, in other words, a communication about a lack of overload. A man appointed assistant professor has thus received the communication that he should be able to handle the work at this level. His abilities have been judged to fit the demands at this job level. But an assistant professor can still wonder whether his abilities fit the job requirements of an associate or full professor. An associate professor only has to wonder whether he will be able to handle the job of a full professor. And a full professor, finally, has the confirmation that his abilities fit all the demands a given institution might require. We assume here that every man who enters the academic hierarchy wants to reach the top of the ladder, wants to become a full professor. Until he reaches that level he cannot be sure that his abilities match those final requirements. But as he advances, the amount of uncertainty will become smaller and smaller. Less and less will he be forced to perceive a discrepancy between his abilities and the requirements of the job. It is in this way that a person's status provides feedback about a lack of overload.

We assume that by receiving a certain status the person learns something about overload; namely, that there is no overload which would prevent him from receiving that status. This communication will influence his perception of the existing overload which in turn influences his occupational self-esteem. The status given to the person will also serve as the basis for his objective public evaluation by relevant others. This evaluation will be communicated to the person. It will be perceived by the person, and this subjective public esteem will influence self-esteem. We can now restate the causal chain described in the previous section.

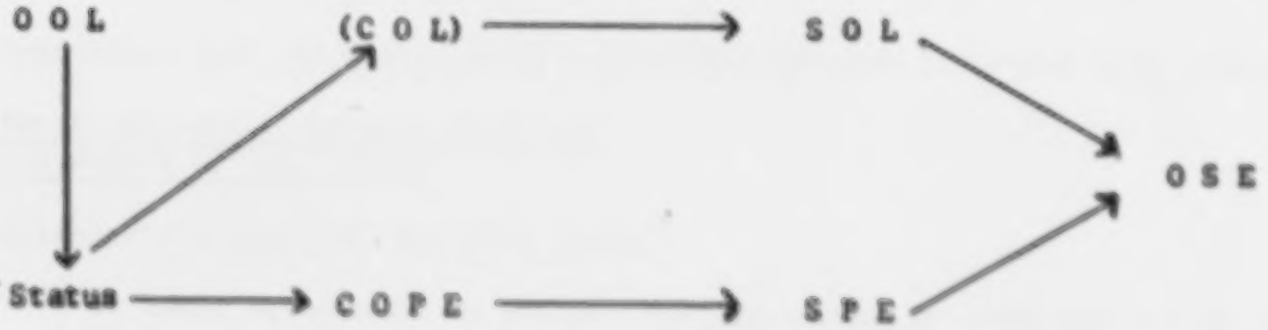

Fig. 4: Theoretical model diagramming the relationships between objective overload (OOL), status conceived of as objective public esteem (OPE), communicated overload (COL), communicated public esteem (COPE), subjective overload (SOL) and subjective public esteem (SPE) with occupational self-esteem (OSE).

Again, we intend to make different predictions for the effects of status on perceived quantitative and perceived qualitative overload. We use the same rationale that was presented in the previous section: that quality of performance will be of greater importance than quantity. Always there is the assumption that the quantity of demands will lead to a time allocation which is different from the person's preferred time allocation.

If this assumption is correct and if status is more a communication about lack of qualitative overload than about quantitative overload, then we can predict that status will lead to a perception of low qualitative overload, and this relationship will be significantly stronger than the relationship between status and quantitative overload.

Hypothesis 3a: Status influences the perception of qualitative overload in that as status increases the perception of qualitative overload will decrease.

Hypothesis 3b: The relationship between qualitative overload and status will be significantly stronger than the relationship between status and perceived quantitative overload.

Using the interpretation that status is the basis of objective public evaluation, we predict that status will be related to subjective public esteem.

Hypothesis 3c: As status increases, subjective public esteem will increase.

The Relationship between Overload and Number of Work Hours

Quantitative overload and work hours

It seems reasonable to assume that the amount of work one has to do will be related to the number of hours spent. J. G. Miller (1960) and his co-workers have demonstrated that information input overload and performance are curvilinearly related. As overload increases performance increases up to a point at which it starts to deteriorate. J. G. Miller (1960) deals with information input overload as requiring an increase in work intensity. Within a given span of time the number of incoming bits of information is increased. The only way to cope with the problem is to work more intensively, more efficiently--if we disregard for the moment the defensive coping techniques such as queuing, filtering, etc. Our concept of overload is different in that we decided to leave intensity out of our discussion. The way we conceptualized quantitative overload there exists a coping mechanism not available to J. G. Miller's subjects--that is, to work longer hours. For a professor, deadlines are lines but not death, as many an editor has learned. In order to arrive at the hypothesis that quantitative overload will lead to an increased number of hours we feel another assumption is needed, and that is the assumption that in order to cope with quantitative overload people will prefer to work longer hours rather than to increase the established working intensity. There is certainly a point beyond which working longer hours is no longer possible and where any further increase in overload could no longer be handled by putting in more time. However, in our sample the perceived stress arising from too heavy a work load and from too many different demands is reported as moderate in degree. The mean value of the total group is 2.4 on a four-point scale. That is about halfway between "Hardly a source of pressure" and "Somewhat a source of pressure." Only two professors in our sample of 122 rate quantitative overload as a "Great source of pressure"; i.e., "4". No matter what their complaints, they continue to function in their assigned roles. There is only one man in our sample about whom one might say that he has broken down under his work load. Thus, we feel that we are dealing with a linear, not curvilinear relationship.

Hypothesis 4a: As quantitative overload increases the number of work hours will also increase.

Qualitative overload and work hours

This relationship seems more complex. Simply working more does not seem as effective a way of coping with qualitative overload as it does with quantitative overload. There is a certain degree of finality about qualitative overload which is not present when the pressure arises from just quantitative overload. Qualitative overload is quite likely to discourage a person. Because of this complexity we dare to venture only a weak prediction. We predict that the relationship between qualitative overload and work output will be significantly different from the relationship between quantitative overload and work output. We predict that the relationship will be less strong, even negative.

Hypothesis 4b: The relationship between qualitative overload and work hours will be significantly different from the relationship between quantitative overload and number of work hours. The relationship will be less strongly positive or even negative.

The Relationship between Overload and Achievement Orientation

So far we have discussed the relationship between status, a variable of the objective social environment, and overload--and we have seen how overload is related to occupational self-esteem. Now we want to point out that overload is affected not only by the objectively existing conditions but also by an attribute of the person, namely achievement orientation. We define achievement orientation as an attitude toward one's work that emphasizes public esteem as a value and that guides one's behavior in such a way as to maximize the probability of reaching public esteem through achievement in one's work. We see this as different from 'achievement motive' as used by McClelland *et al.* (1953). Their concept seems to relate more to the personal affect connected with situations of competition. Our concept tries to get at the striving for an objective public esteem. In Riesman's (1950) terms, we would say that achievement orientation is a more "other-directed" tendency than McClelland's achievement motive.

It was in helping us to identify those realms of the academic work environment wherein achievement is most likely to lead to public esteem that we found the writings of Wilson (1942) and Caplow and McGee (1958) most useful. We rated the interviews for the presence or absence of the following characteristics which will be defined more fully in the section on methodology and in the Appendix: (1) Emphasis on research, (2) Leadership, (3) Range of activities, (4) The degree to which the person pushes himself, (5) The person's feelings of self-confidence and achievement, (6) His attitude toward pressure, and (7) The general level of his drive as an indication of the intensity of living.

We think of achievement orientation as a relatively stable characteristic of the person. Thus we assume that a person's achievement orientation will influence his perception of overload. We would expect that a person with high achievement orientation would be inclined to take on a greater workload than a person with low achievement orientation, if this is seen as a way to achieve public esteem. By taking on more the person may realize, however, that he has taken on too much and that his preferred distribution of duties no longer corresponds to the distribution of duties that is now required of him. Thus we should find a positive relationship between quantitative overload and achievement orientation.

Hypothesis 5a: If quantitative overload is seen as a way of achieving public esteem, then the greater the achievement orientation the greater will be the quantitative overload.

The relationship between achievement orientation and qualitative overload should be different. Since qualitative overload is hypothesized to lead to low public esteem, and since men of high achievement orientation are assumed to try to maximize public esteem, such a person will try to avoid taking on tasks that lead to qualitative overload. It may, however, be that unwittingly and incidental to taking on too much the person may also take on more than his abilities permit him to do. In view of these two factors operating we don't feel confident enough to make a strong prediction about the relationship between achievement orientation and qualitative overload. We do, however, expect that this relationship will be significantly different from the relationship between achievement orientation and quantitative overload.

Hypothesis 5b: The relationship between achievement orientation and qualitative overload will be significantly more in the negative direction than the relationship between achievement orientation and quantitative overload.

The Relationship between Overload and Cholesterol

In the discussion of cholesterol we rely mainly on the work by Moses (1963) who discusses cholesterol in its relation to atherosclerosis.

Cholesterol is a waxy, insoluble substance which is to some extent present in all cells of the human body, but which has its highest concentration in the brain and the adrenal cortex.

Cholesterol is to some extent contained in all ordinary diets. Moreover, the body can synthesize cholesterol from any dietary source providing acetate. Cholesterol plays a major role in the pathogenesis of atherosclerosis because it is a substance that can accumulate in the walls of the arteries and produce an obstruction. Moses (1963) states that "it is generally accepted that from one-half to three-quarters of the dietary cholesterol is absorbed [into the blood stream]." (1963, p. 92)

Moses (1963)--citing Gould (1954)--says that cholesterol is extracted from the blood by the liver, particularly by converting it into bile acids. From 70 to 90 per cent of the cholesterol degradation involves the formation of bile acids. However, as he also points out, the evidence on this point is not absolutely clear.

Cholesterol is of interest to this study because there is an increasing body of literature which links serum cholesterol levels to situational stress. The literature on this point is reviewed by Moses and by Kasl and French (1962), who write:

> There are several studies (Russek and Zohman, 1958; Friedman, Rosenman and Carroll, 1958; Friedman and Rosenman, 1959) which demonstrate that men under 45 who are subjected to such occupational stresses as deadlines, intense competition, long hours, or secondary jobs will have higher levels of serum cholesterol and greater incidence of coronary artery disease. The first and third study cited above, moreover, tend to suggest that this occupational stress originates more in the intense motivation of the men than in the job situation; a laboratory study by Friedman and Rosenman (1960) corroborates this suggestion. However, these studies do not warrant the conclusion that the personality characteristic of a driving ambition is alone responsible for an abnormally high incidence of coronary artery disease in a particular group. An alternative hypothesis suggests itself if we recall that the highest rates of disease were found in the male clerical workers in relatively low status white collar jobs: namely, what may be pathogenic is not a driving ambition but a relatively low job status in the presence of such an ambition. The executives, in whom there is presumably a favorable balance between high ambitions and high accomplishment, will give evidence of their ambitions on the serological data but remain relatively healthy. Unfortunately for this interpretation, the serological data on male white collar workers are lacking. In any case, these studies suggest that certain job dimensions (e.g., time pressures, overloads) and certain self dimensions (e.g., "driving ambition") ought to be included in any comprehensive study of the effects of occupational status on health. (1962, p. 72).

An interpretation of such a relationship is given by Dreyfuss and Czaczkes (1959) in their study of medical students under examination pressure. They venture the suggestion that increased cholesterol levels provide a potential source of adrenal steroid hormones required in order to cope with stimuli of a tension-producing situation.

It should, however, be noted that these relationships between cholesterol and overload were established either by inference from the prevalence of heart disease (Russek and Zohman, 1958; Friedman and Rosenman, 1959) or from studies of within-person variations of cholesterol levels due to episodes of situational stress (Friedman et al., 1958; Thomas and Murphy, 1958; Dreyfuss and Czackes, 1959). In this study we can investigate only the relationship between cholesterol levels and overload at a fixed point in time. It is by inference that we assume that a chronic condition of stress will lead to a lasting elevation in the levels of serum cholesterol. This difference may affect the relationship. It is thus only tentatively that we hypothesize that overload will be positively related to cholesterol levels. We hypothesize further, tentatively, that since the relationship between cholesterol and pressure seems to originate in the intense motivation of the men more than in the nature of the job, that qualitative overload--which is assumed to be more closely related to the self--will show a stronger positive relationship to cholesterol than quantitative overload.

Hypothesis 6a: The higher the quantitative overload the higher will be the serum cholesterol level.

Hypothesis 6b: The higher the qualitative overload the higher will be the serum cholesterol level.

Hypothesis 6c: Qualitative overload and serum cholesterol levels will be related more strongly than quantitative overload and serum cholesterol levels.

Achievement Orientation and Its Relation to Serum Uric Acid

The interest in an investigation of the relationship between serum uric acid and achievement orientation arose from the fact that both of these variables seem to be related to a third one, gout. For a definition of gout we quote Cobb (1964):

> "Gout is an excruciatingly painful form of arthritis that begins with intermittent acute attacks and may progress to the chronic tophaceous form with permanent deformities and disabilities. The arthritis is apparently due to the precipitation of urate crystals in the joints...."
>
> "At the Symposium on Population Studies in Relation to Chronic Rheumatism, held in Rome in 1961, a set of diagnostic criteria for field study purposes was recommended, to wit a diagnosis of gout should be made only when at least two of the following four criteria have been met:
>
> 1. Serum uric acid above 7.0 mg/100 ml in males and above 6.0 mg/100 ml in females, determined by the spectrophotometric uricase method.
> 2. The presence of tophi.
> 3. The demonstration of urate crystals in synovial fluid or of urate deposition in tissues by chemical or microscopial examination.
> 4. A clear history of attacks of painful joint swelling...."

Thus, gout is a disease that is related to elevated levels of uric acid. For our discussion of serum uric acid we rely heavily on the work by Talbot (1964). He describes the uric acid metabolism as follows:

> "Uric acid is the end-product of metabolism of purine substances in humans.... Most other mammals convert uric acid to allontoin and excrete only small amounts of the former substance...
>
> "Most of the uric acid [of humans] is excreted in the urine. Additional amounts are excreted by way of the intestinal tract and the sweat glands." (1964, 29)

An increased concentration of uric acid in the body fluids which leads to the deposition of urate crystals in the joints may be the result of external factors or may be brought about by internal derangements. Talbot (1964) concludes from a review of the available literature:

> Improper diet, excessive intake of alcoholic beverages and exposure to lead have been implicated as external noxious forces.
>
> There are at least three internal dysfunctions which may lead to an increased concentration of urate in body fluids. These are:
>
> 1. Diminished destruction by enzymes.

> 2. Diminished excretion by the kidneys.
> 3. Increased formation through a fault in intermediary metabolism.
>
> Impaired destruction by the human organism of significant quantities of uric acid by an enzymatic system comprising uricase is not of sufficient magnitude to explain the persistent hyperuricemia [in gout] ... Diminished excretion of urate by the kidneys has enjoyed limited popularity as an explanation of the increased concentration in the serum... Increased formation of uric acid in the body leading to an increase in the size of the metabolic pool continues to be an attractive explanation for the major portion of the metabolic disturbance. (1964, p. 40).

But gout--which in part, at least, is due to hyperuricemia--also seems related to achievement. Students of gout have long noted how frequently this disease is mentioned by national biographers, and how commonly it is encountered among men of distinction. Rodnan (1961) describes how men of action like Alexander the Great, or Charlemagne, poets like Goethe, and scientists like Newton and Darwin, all probably suffered from gout.

Thus, we have found that there is a relation between serum uric acid and gout, and between gout and achievement. If one grants the plausible assumption that achievement presupposes achievement orientation, then it is reasonable to expect an association between serum uric acid and achievement orientation. Several writers have speculated about this relationship. In the mid-50's Orowan (1955) pointed out that significant levels of uric acid exist among mammals only in the blood of higher apes and man. He proposed, but did not prove, that uric acid like other purines, cafeine and theobromine, has the ability to stimulate the cerebral cortex. He postulated that the superior cerebration of man and primates was due to high levels of uric acid in these animals resulting from a mutation responsible for the loss of hepatic uricase. Later Haldane (1955) proposed some testable consequences of Orowan's hypothesis for an endogenous cortical stimulant. Among these were the suggestions that hyperuricemics are on the average more intelligent, or at least less susceptible to some kinds of fatigue, than others. Following Haldane, Stetten and Hearon (1959) studied the relation between serum uric acid and army intelligence test scores in 817 army inductees. The correlation between these two variables was found to be low but significant ($r=.08$, $p < .05$).

In 1963, Dunn et al. noted a social class gradient of serum urate levels in males. This report indicated that serum urate levels appeared to be more related to the achieved social status of the individual than to that of his ancestors; that perhaps a tendency to gout was a tendency to the executive suite. In an editorial which accompanied the communication, the J.A.M.A. (1963) stated: "If this observation is to fit with the evidence for a substantial genetic influence, [in hyperuricemia] one is forced to conclude that the serum uric acid value is related to behavioral characteristics that lead to outstanding performance and therefore to upward mobility or the maintenance of high social status achieved by one's forefathers." (1963, p. 196) Thus, we hypothesize that there will be a positive relationship between serum uric acid and achievement orientation.

Hypothesis 7: As serum uric acid levels increase, achievement orientation will also increase.

The Relationship between Achievement Orientation and Cholesterol

We have previously discussed the relationship between cholesterol and situational stress. But the literature also points to an association between cholesterol and certain personality structures. Friedman and Roseman (1959) have described a group of individuals with certain common personality characteristics which they have called "overt behavior pattern A". It is characterized by "excessive competitive drive, a persistent desire for recognition, and advancement, and a habitual propensity to accelerate their pace of living and working. Or in a symposium on the factor of emotional stress in coronary heart disease it was suggested by Kissin _et al_. (1959) that if there is a coronary personality pattern it seems well described by the term 'Sisyphus complex', the picture of a man ceaselessly striving without joy, to reach a forever unattainable goal.

In certain respects these descriptions seem similar to the way we have described the correlates of serum uric acid. Thus, we hypothesize that men who score high on our index of achievement oriented behavior will also have higher levels of cholesterol. Such a hypothesis is further suggested by the work of those authors who found an association between serum uric acid and serum cholesterol. In the study of a whole community, Barry _et al_. (1964) found that the distribution of serum cholesterol values in men with high serum uric acid is shifted significantly to higher values when compared with the entire male population. In a study of 27 paitents with high levels of serum cholesterol, Adlersberg (1949) found that one third had hyperuricemia, and one third had serum urate levels at the borderline (between 5 and 6 mg/100 ml.) It should, however, be pointed out that this evidence is not uncontested. In another community study Mikkelsen and Dodge (1962) found a correlation of r = .08 which the authors evaluate as "no appreciable association", although the correlation is significant at the 0.01 level because of the large number of cases. No relationship between cholesterol and serum uric acid was found in a group of 269 executives as reported by Dunn *et al*. (1963). Leeper *et al*. (1960) in their study of hyperuricemia in myxedema also do not find an association between the two variables.

Hypothesis 8: As achievement orientation increases, serum cholesterol levels will also increase.

- - - - - - - - - - - - -

This concludes our theoretical discussion. We will now turn to a description of the methodology, the operational definition of the variables, and the presentation of a picture of the university professor.

CHAPTER III

METHOD AND MEASURES

The Sample

The sample of this study consisted of professors at the University of Michigan who entered the periodic faculty health examination between August 15, 1963 and February 15, 1964. It consisted only of males in the three academic ranks of assistant, associate, and full professor. Academic administrators like chairmen or deans were included.

During the period of data collection, 136 men were eligible for our study. Those on academic leave were not eligible. Of these 136 men with academic rank, 124 or 91% were willing to participate in our study. As it turned out one man was on retirement furlough and was therefore excluded. Another one withdrew from the faculty examination before he could be interviewed. Thus, the sample which is used for at least some kind of analysis consists of 122 professors and academic administrators. In the next chapter we will describe the characteristics of the sample in greater detail.

The Source of the Data

In Table 1 below we present an overview of the different ways in which the data for this study were collected. The data come from semi-formal interviews, self-administered questionnaires, and the results of an extensive physical examination.

TABLE 1.- Various sources of the data

Part	Source of the data
Part 1	Open-ended interview and three check-lists completed during the interview.
Part 2	A set of self-administered questionnaires which the subject filled out at home at his convenience.
Part 3	A self-administered questionnaire given to the wife of the professor.
Part 4	A physical examination including laboratory tests and extending over a two-week period.

Given such a great amount of diversified information it is not surprising that the return rate is varying. These rates were as follows:

TABLE 2.- Return rates of the data

Part	% completed	% partially completed	% not returned
1	100	0	0
2	86	7	7
3	92	0	8
4	98	0	2

It should be pointed out that even in the 105 sets of self-administered questionnaires which were returned, supposedly completed, single questions were frequently left unanswered. The analysis of this study will, therefore, have to operate with constantly varying number of subjects.

The Data Gathering Procedure

The participation in the faculty health examination is voluntary. Between 75%-80% of all those invited do participate, however. The professor is invited by a form letter. After the professor had accepted the invitation to the physical health examination he was contacted by a letter sent to his home asking him to participate in an extension of the physical examination. We made no secrets about the fact that the additional participation would be lengthy, five hours in fact (Appendix A).

Within a week after the professor had received this letter, his office, his secretary or he himself was contacted by phone to set up an appointment to inform him further about the study. Only three of the twelve professors who ultimately refused did so over the phone.

The purpose of the personal contact was to acquaint the professor with the person who would interview him and in whose hands he would have to place confidential information. Also the interviewer wanted to make it more difficult for the professor to say "no". But the main task remained to assure the subject of confidentiality, and to convince him that the study was worthwhile doing. One professor asked for a 20 minute exposition of the theory. Many wanted to know where the support came from. It was at this point that our connection with the faculty health examination was probably most helpful. Frequently the professor acknowledged what he considered to be an obligation on his part to participate in return for having been given the examination. Only in the case of one abusive professor did the interviewer slip into using this same argument. Mostly the importance of the problem was emphasized and the competence of our Institute to deal with it. Among the reasons for participation in the study, two seemed to have been predominant: An interest in the study, and, more important, a sense of duty to cooperate in a bona fide research effort, a sense of duty and obligation to the university as a whole. This came out especially clearly in the case of the university administrators. Not one of the 12 professors who refused is either chairman or dean. On the other hand our sample includes three chairmen, three deans, and nine men in positions like assistant dean, associate chairman or director of an institute.

If the professor chose to participate, a date and a place were set for the interview, which was to last from two to two-and-a-half hours. Whenever possible the interview was conducted in the professor's office. If that was not possible the professors were invited to the Institute for Social Research. Variations on this arrangement were minor. Several professors invited the interviewer to their homes; one professor invited the interviewer for dinner; some made arrangements for conference rooms.

The interviews (Appendix B) ranged in length from an hour and five minutes to three and three-quarters of an hour. From direct comments to the interviewer, from comments made to professors in the Institute, and from indirect comments via third persons and party talk we can rest assured that the professors found the interview relaxing, enjoyable, and even therapeutic. From a direct question at the end of the interview we learned that they considered the interview comprehensive, thorough, and well conducted. Only three professors felt that we were getting at the superficial functional aspects of a professor's role only. Two came from the humanities, and one felt that other problems in a man's life so far outweigh work problems that responses to questions about work could not be meaningfully related to health.

The interview asked identical questions of all professors. But withn the interview the questions varied in the degree to which they encouraged free and undirected responses in answering them. The introductory question was simply, "How would you describe your job? What do you do?" On the other hand, the interview included such specific questions as, "Could you estimate how many hours per week you spend on all your professional activities?"

At three points the interview was interrrupted and the subject was given a checklist to complete. This procedure worked very well and the use of interspersed checklists should be increased in eventual further studies of this group. Most interviews were conducted in one sitting. In four cases the interview was broken up into two parts because of scheduling problems.

At the end of the interview a new time was arranged at which the interviewer was to bring the questionnaires to the professor. This date was usually from a week to ten days later. In the mean, each of the open-ended interviews was examined for dimensions which best described the man's job, his duties, and the professional areas he worked in such as research, teaching, administration, and so forth. The procedure here was the following: The first question of the interview was the most general one. It asked, "How would you describe your job? What do you do?" This question was the basis for extracting for each professor 16 job dimensions. If the description of the job was detailed and extensive, 16 dimensions were extracted from the answers to this one question. If the description was meager, the missing number of dimensions was selected from a checklist of human traits the professor was asked to rate for their importance. Those he rated very important were included. If the total number of traits which were rated very important for the personality of a professor brought the list of possible dimensions to more than 16, it was the interviewer's judgment which decided which of those rated very important were to be included. The instance that the answers to the question "What do you do?" and to the checklist did not yield 16 dimensions did not occur.

In order to get a picture of the distribution of dimension we took a random sub-sample of 25 and tabulated the distribution of dimension. In a sub-sample of 25 there are 400 dimensions (16x25). Of the 400, 16% or 62 dimensions are unique; they occur only once. The dimensions that are used by at least 40% of the subsample are listed below, in Table 3.

TABLE 3.- Distribution of the dimensions most frequently used in the description of the job in a random subsample of 25 cases

Dimension	Frequency	Percentage
Teaching	24	96
Carrying out research	19	76
Planning research	18	72
Keeping up with the field	18	72
Communicating in writing	14	56
Supervising others	12	48
Doing "chores", e.g., paperwork	12	48
Getting along with people	11	44
Administrative duties	11	44
Publishing regularly	10	40

While there is no check in this study as to whether or not these dimensions fully covered all aspects of the job, we are convinced and proceed on the assumption that these job dimensions gathered from the interviews offer a better description of the man's job than if one standard list of dimensions had been applied to all professors.

The 16 dimensions extracted from the interviews were typed into empty blank spaces provided for this purpose on the questionnaires. Thus each professor answered our questions with respect to dimensions which fitted as closely as possible his particular job. The stem of the questions, however, was standard for all professors. Thus, we asked all professors, "How satisfied or dissatisfied are you with your present degree of skill or talent with respect to this dimension?" The questions were the same for all, but the dimensions with respect to which these questions were asked varied from person to person.

It is our general impression that to the extent to which the professors liked the interview they disliked filling out the questionnaires. The average number of weeks it took them to return the forms was eight. Frequently, these forms were filled out sloppily and without proper regard for the instructions, although the professor had read all the instructions in the presence of the interviewer. We had assumed that once the professors chose to participate, without being coerced, they would apply themselves to this task with the same diligence they give to the rest of their duties. Well, they did not.

A professor who did not return his questionnaire within six weeks was sent a reminder (Appendix C). If he did not respond to this reminder, he received several weeks later the visit of a charming young lady urging him to please return the forms.

Following the findings of Cannell and Fowler (1963) we did not think it advisable to have any further follow-ups. Cannell and Fowler asked subjects whether they had or had not been in the hospital in a given period of time. They had independent checks as to the number of hospital admissions of each subject. They found that people were not always accurate in their answers and that the percentage of inaccurate answers increased with the number of follow-ups. The percentage of inaccurate answers increased particularly with and after the third follow-up. As it was we were able to get with our procedure a return rate of 86% completely returned sets of questionnaires. Another 7% of the sets were returned at least partially completed.

Concomitantly with the interviewing of the professors went the questioning of the professors' wives. At the end of the interview the professor was asked for his permission for the interviewer's assistant to give a questionnaire to his wife. With the exception of three, all those who had wives were amenable to this request. The wives were sent a letter explaining the purpose of the questionnaire (Appendix D). The questionnaires themselves were delivered and picked up by a young lady who called first to make sure that she was coming at an opportune time. How wise and appropriate this procedure was became clear in the few cases where the wives insisted on returning the questionnaires by mail. In these cases it often took several reminders to receive the form back. Only three wives refused outright upon being contacted. One person returned the questionnaire insufficiently completed and with a note doubting the confidentiality of our procedures. We returned the questionnaire to her in order to alleviate these concerns. Finally, we sent a letter thanking the professor for his participation and assuring him that he would be given an abstract of the results at the time of the completion of the study (Appendix E).

The Variables and Their Measurement

In the theoretical chapter, we discussed first the hypotheses relating to overload and its relationships, then the relationship between serum uric acid and achievement orientation, and finally the relationship between cholesterol and achievement orientation. Here we will order the presentation somewhat differently. We will present the discussion of the measurement of the variables according to the categories defining the main foci of this theoretical approach, and corresponding to the categories of Figure 1. We will present the variables and how they were measured as well as the meaning of the variables in this section. Table 4 presents a list of these main variables.

TABLE 4.- List of the major variables used in the study

<table>
<tr><th colspan="3">Characteristics of the person</th></tr>
<tr><th colspan="3">Achievement Orientation Defensiveness Serum Uric Acid</th></tr>
<tr><th>Objective Environment</th><th>Psychological Environment</th><th>Behavioral, Attitudinal and Physiological Reactions</th></tr>
<tr><td>Status</td><td>Quantitative overload</td><td>Occupational self-esteem</td></tr>
<tr><td></td><td>Qualitative overload</td><td>Number of work hours</td></tr>
<tr><td></td><td>Self as source of pressure</td><td>Cholesterol</td></tr>
<tr><td></td><td>Legitimacy of pressure</td><td></td></tr>
<tr><td></td><td>Subjective public esteem</td><td></td></tr>
</table>

Status, a Variable of the Objective Social Environment

Status has been recognized as a salient variable affecting not only other sociological characteristics of the person but also psychological reactions and a person's health. The relevant literature is summarized by Kasl and French (1962) in the report of their study relating occupational status to illness behavior.

In this study we measure status basically as professorial rank. It was coded on a three point scale: Assistant professor (1), Associate Professor (2), and Full professor (3). We decided on this classification since even the 15 administrators included in our sample perceive themselves as members of the academic community and continue to teach and do research.

However, since administration does add a dimension to the work situation of the faculty member, we also ran correlations on the professorial ranks excluding administrators (N = 107), and on administrators (N = 15) as a separate group. Wherever it makes a difference that a person is chairman or dean we will point to these differences and try to understand them. The group of 15 administrators contains 14 full professors and one associate professor. The administrative functions range from associate chairman to dean. Since the group is so small we do not intend to make any further differentiation among the group of administrators.

Basically, we feel that for an analysis of status differences it would be sufficient to deal with the three professorial ranks, but in order to understand the effects of the job environment it might be helpful to separate the administrators from the strictly academic ranks.

It might be argued that professorial rank is not the best measure of status, and that it would have been better to use the ratings of relevant others. Unfortunately, this procedure, which has been successfully used by Kahn et al. (1964), was not possible in the present study.

Characteristics of the Person

Defensiveness

The recognition of the importance of a concept like 'defensive distortion' or 'defensiveness' comes from Sigmund Freud. He defines a defense as "a general designation for the techniques which the ego makes use of in conflicts which may lead to neurosis" (1936). Anna Freud developed her father's ideas further (1946). As Miller and Swanson (1960) point out, such a definition is too general to be of help to the empirical worker. They state:

> To identify repression or, for that matter, any other defense, one must be able to locate an event, usually an action tendency, which if it were expressed directly, would create objective difficulties or violate the person's internal norms. Because this unconscious impulse engenders anxiety, the individual unconsciously substitutes some alternative for the original. (1960, page 196)

Thus, the psychoanalytic concept of defense is mainly that of an unconsciously operating ego mechanism. But this does not exhaust the defensiveness which alters a person's answers in a test or interview situation. There can be conscious defensive distortion. Such conscious distortion enters into the process of trying to give answers that are socially desirable. This concept of social desirability and its effects on test answers was extensively studied by Edwards (1957). Edwards correlated judges' ratings of the social desirability of personality-test items with the probability of their endorsement. He found a correlation of .87. The more favorable the social-desirability rating of an item, the greater the likelihood of its endorsement under standard test-taking instructions.

In dealing with the problems of defensive distortion we have to realize that there is first the person's "real" self, real in the abstract sense of Kant's Ding an sich. It can never be fully known. It is only inferred. This "real" self is perceived by the person as a set of attributes along given identity dimensions. This perceived self is already influenced by defensive distortions in such a way as to keep self-esteem high. We investigate this picture of the perceived self by evaluating the presented self, the picture of himself the person chooses to reveal to the interviewer. Defensive distortions are assumed to alter this presentation of the self as well. Thus, defensiveness alters both the perception of the self and the presentation of the self.

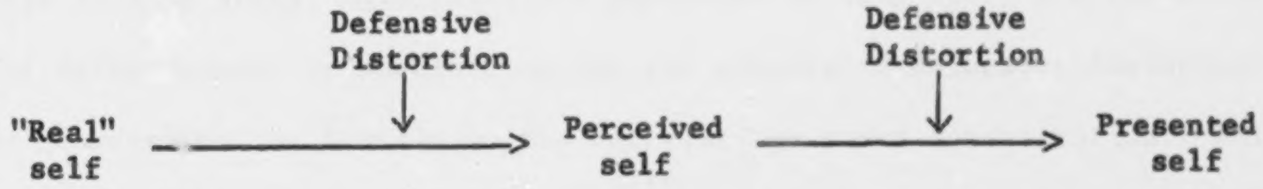

Fig. 5: Diagram representing the two aspects of defensive distortion

What we call the "real" self includes everything that is real in Lewin's sense of the word. It comprehends everything that has effects, including unconsciously perceived aspects of the self. The 'perceived self' in contrast is assumed to include only those aspects of the self that are conscious or preconscious.

The concept of defensiveness has recently been treated in the wider context of an "approval motive" by Crowne and Marlow (1964) who present a review of the relevant background literature and go on to evaluate existing experimental evidence as it pertains to the proposed integrating concept of "approval motive."

In our considerations about the measurement of defensiveness we dismissed on apriori grounds the need to guard against outright lying. The professors are all volunteers. Their willingness to cooperate was excellent as judged from the rapport during the interviews. The importance of the research was realized by the great majority. It, thus, seemed extremely unlikely that we had to deal with the problem of deliberate lying.

In order to guard against unconscious distortion and the effects of social desirability, we decided to use the K-scale of the MMPI as a corrective measure. It has been well researched (Dahlstrom and Welsh, 1960) and has weathered the test of wide application in practical situations. We know that the use of this one corrective scale will not eliminate all effects of defensive distortion but it seemed the most efficient way feasible in this study. All relations presented in this study are corrected for defensiveness by partialling out the effects of defensive distortion as measured by the K-scale on the correlations under consideration. Only the relationships between variables that were independently assessed and which do not come from self-report data such as status or serum uric acid were not corrected for by partialling out the effects of defensiveness. Table 5 presents the correlations between our variables and defensiveness as measured by the K-scale.

The meaning of these correlations is that a high score on the variable listed first implies a high degree of defensiveness when the correlation is positive. A high score on the first variable is associated with a low degree of defensiveness when the direction of the correlation is negative.

TABLE 5.- Correlations between the variables of the study and the K-scale of the MMPI

Variable	Correlation with scores on the K-scale		
	N	r	p
Occupational self-esteem	105	.44	< .01
Quantitative overload	108	-.19	< .05
Qualitative overload	108	-.35	< .01
Self as source of pressure	107	-.18	N.S.
Legitimacy of pressure	107	.11	N.S.
Subjective public esteem	105	.36	< .01
Achievement orientation	87	.12	N.S.
Emphasis on research	87	-.31	< .01
Leadership	87	.16	N.S.
Range of activities	87	.31	< .01
Pushing of self	87	-.17	N.S.
Achievement/self-confidence	87	.29	< .01
Attitude toward pressure	87	.19	N.S.
Drive	87	.05	N.S.
Age	108	.21	< .05
Status	108	.13	N.S.
Serum uric acid	102	-.08	N.S.
Cholesterol	104	-.06	N.S.
Diastolic blood pressure	106	.09	N.S.
Obesity	108	.02	N.S.
Work hours (reported by professor)	98	.08	N.S.
Work hours (reported by the wife)	97	.01	N.S.
Job worry (reported by the wife)	99	-.31	< .01
Job worry (reported by professor)	107	-.34	< .01

The items making up the K-scale are found in Appendix F. Since the K-scale was frequently not filled out completely by the professors, we had to use average scores in order to make the scales comparable for all professors. The average number of omissions per test was 0.12. The omissions are randomly distributed across items.

The scale correlates significantly with age ($r = .21$, $p < .05$) but it does not correlate significantly with academic rank ($r = .13$). The mean value of the K scores for all professors is .56. The average for 50 college students is .54. The average for 100 electrical engineers is .56 (McKinley _et_ _al_., 1956). Thus, the average found in this group seems to correspond quite well to the most comparable groups on which normative data can be found.

With respect to the reliability of the K-scale, Meehl and Hathaway (1956) state:

> Test-retest coefficients were .72 and .74 computed on two groups, one of which was retested at intervals varying from one day to over a year, the other after a lapse of 4 - 15 months. (1956, p. 26)

The validity of the K-scale as a measure of defensiveness was shown by Meehl and Hathaway (1956), and McKinley _et_ _al_. (1956) who report the studies which showed increased predictability of abnormal personality patterns when using the K-scale.

Serum Uric Acid

Earlier, serum uric acid was described as an end-product of human metabolism which is involved in the pathogenesis of gout. Here we want to extend our earlier discussion by considering additional aspects of serum uric acid relevant to the measurement of this variable, such as its stability over time, and the normal range of its concentration in the blood.

Talbot (1964) writes that the "concentration of uric acid in the serum in normal males is less than 6 mg/100 ml. In patients with gout, irrespective of the presence of acute or chronic symtoms, and irrespective of the stage of the disease, the concentration is greater than 6.0 mg."

During a 24-hour span the concentration of uric acid in the serum does not seem to vary greatly. Zachau-Christiansen (1959) drew blood from hospital patients on a normal, though protein low, diet. The observed variations in any one subject was not greater than 0.5 mg/100 ml. Dunn _et al_. (1963) confirm this finding, for the most part. Following subjects over a two-month period also did not reveal any significant within-person variance. These findings were substantiated in the study of another group, of 58 executives who had two serum uric acid determinations at an interval of one year. Dunn _et al_. conclude that serum uric acid is a reasonably stable characteristic of individuals. The concentration of uric acid in the serum also does not seem to vary greatly with age in adult males. As a result of a population study carried out in a Michigan community, Mikkelsen and Dodge (1962) report essentially stable serum uric acid values in males after puperty. Dunn _et al_. (1963) also see no effect of age on serum uric acid levels in the age range from 30 to 66 years. In our sample the correlation between age and serum uric acid is $r = .09$ which is not significant.

During the years from 1938 to 1946 Smyth, Cotterman and Freyberg measured the distribution of serum uric acid levels in families. In 1961 and 1962 Rakic _et al_. (1964) reanalyzed 17 of the original 19 families.

They present the data in tabular form and conclude that hyperuricemia is a stable trait but they do not present a correlation between the original and the repeat measures, probably because the methods used in the early study and the later study are not absolutely comparable. But since these are the only data--to our knowledge--where the serum uric acid levels were measured after such a long time interval, we decided to compute the Pearson correlation coefficient for those males 20 years and older at the time of the original investigation. There are 27 such cases and the correlation between the first and second measurement in these 27 cases is r = .69 which is significant at better than the .01 level. We take this as further support that serum uric acid is a relatively stable characteristic of the individual.

Of the variety of non-genetic factors that have been reported to affect or to be correlated with serum uric acid (Talbot, 1964; O'Brien et al., 1964; Dunn et al., 1963) the relationships to obesity and blood pressure were measured in this study. The correlation between obesity and serum uric acid in our sample is r = .25 ($p < .05$), and between diastolic blood pressure and serum uric acid the correlation is r = .17 ($p < .05$).

The normal concentration of uric acid in the serum--at least in the developed countries of the West--seems to lie between 5.0 and 5.2 mg/100 ml. The evidence is summarized by Cobb (1964) in a table which is presented below.

TABLE 6.- Mean serum uric acid levels as determined by the spectrophotometric uricase method for certain Caucasian populations

Population	Males, Post-Adolescent N	Mean SUA	Females N	Mean SUA
High school students, U.S. (Cobb, 1963)	138	5.1	74	4.0*
Small community, U.S. (Mikkelsen et al. 1962)	573	5.2	720	4.0*
Military recruits, U.S. (Stetten & Hearon, 1959)	817	5.1	-	-
"Normals", Denmark (Hauge & Harvald, 1955)	130	5.1	150	4.0
Hospital staff, Denmark (Gjorup et al., 1955)	143	5.0	157	3.8
Penitentiary, U. S. (Decker et al., 1963)	90	5.0	-	-
Rural community, England (Popert & Hewitt, 1962)	436	4.5	320	3.5*

*Female populations known to contain no persons over 45.

There does exist, however, a clear social class gradient in the mean values of uric acid levels in the serum. Cobb and Brooks tabulated the available evidence for a recent research proposal. This table is presented below.

TABLE 7.- Mean values of serum uric acid levels in samples of differing social status

Population	Males N	Males mg. %	Females N	Females mg. %
Hourly workers (Dunn et al., 1963)	268	4.7	185	3.7
High school students, U.S. (Cobb, 1963)	138	5.1	74	4.0*
Professionals (Brooks, unpublished)	139	5.2	76	4.2
Medical students (Cobb, 1963)	96	5.4	-	-
University professors (this study)	113	5.7	-	-
Executives (Dunn et al., 1963)	339	5.7	-	-

*Female populations known to contain no persons over 45.

If we divide our total sample of university professors into the various status subgroups, we find the distribution of mean serum uric acid levels presented in Table 8.

TABLE 8.- Mean serum uric acid levels distributed by status level

Status		Mean values of serum uric acid	
		N	Mean
Total sample		113	5.66
Assistant professor	(a)	48	5.50
Associate professor	(b)	23	5.50
Full professor	(c)	29	5.95
Administrator	(d)	13	5.92
All professors excluding administrators		100	5.63
Significance of differences among groups a to d		$F = 1.29$	$p > .05$

Until recently, it had been generally accepted that high concentration of serum uric acid in the blood was an inherited characteristic. O'Brien (1964) cites the relevant evidence. However, on the basis of the study of two Indian tribes, the Blackfeet of Montana and the Pima Indians of Arizona, O'Brien comes to the conclusion that only about 24% of the variability of serum uric acid can be attributed to heredity.

These findings agree with the conclusions of Neel _et al_. (1965) who, on the basis of a reanalysis of 17 families first studied around 1940 state that "as a biochemical trait, serum uric acid level would... seem to fall in a category with cholesterol level or glucose level or even blood pressure, all biochemical traits which increasingly appear to have complex genetic backgrounds influenced in the manifestation by multiple environmental factors." (1965, p. 20)

Measurement of serum uric acid: The concentration of uric acid in the serum was measured by the enzymatic spectrophotometric method advocated by Liddle, et al. (1959) in 1959. The method requires that ultraviolet rays are sent through the serum before and after uricase has been added. Uricase is an enzyme that converts uric acid to allontoin. The difference in the absorption of ultraviolet rays has been found to be directly proportional to the concentration of uric acid in the serum.

This method is now preferred because it is specific to uric acid. The process of measuring does not lose any uric acid and there are also few interfering substances which affect the absorption of ultraviolet rays. The method for determining the technical error of this procedure is described by Dunn et al. (1963). For duplicate determinations done at the same day the error was 0.03 mg/100 ml and for those done one week apart the error was 0.07 mg/100 ml. Since Mr. Brooks did the laboratory analysis for Dunn et al. and for this study, and since the same standards of exactitude prevailed, no special determinations of technical error were made in this study.

Achievement orientation

In order to test the hypothesis that the level of uric acid in the serum is related to achievement orientation as described in the theoretical discussion we developed an index of achievement orientation which tried to assess seven dimensions. These seven dimensions are fully described in the appendix (Appendix G). Here we will give a more general description which we hope will be sufficient for an understanding of the measure.

Achievement and self-confidence: Here we assess the professor's occupational self-esteem as it expresses itself in the interview by the reporting of achievements--papers, books, honors, etc.--and by an assessment of the degree of pride with which he reports these achievements.

Drive: Here we rated a life style. We tried to assess the individual's output of energy, and the intensity of living and working.

Leadership: This variable is a measure of the tendency to lead others by persuasion. It involves strong interest in the smooth functioning of interpersonal relations. It is closely related to what Mann (1965) calls 'human relations skills'.

Range of activities: We rated the use of professional skills in off-campus activities at the national, state, and community level. Any indication that a man engages in a wide variety of activities will raise his score on this dimension. The use of this dimension was suggested by the work of Dunn et al. (1963) who found a significant association between the number of activities high school students engaged in and their serum uric acid levels.

Pushing of self: Along this dimension we rated persistence and tenacity in the pursuit of professional goals. In order to assess this dimension we coded all indications that the professor was pressing himself to the limits of his capacity. We found this expressed in the number of hours he reportedly works in an average week. The correlation is $r = .49$ ($p < .01$).

Emphasis on research: Here we rated the relative importance of and preference for research as compared with teaching. We take this rating as an operationalization of status striving in the current academic environment. We find justification for this operationalization in the work of Caplow and McGee who conclude that when professors "are evaluated..., either as candidates for a vacant position, or as candidates for promotion, the evaluation is made principally in terms of their research and contributions." (1958, p. 82) Any measure of achievement orientation, as it was defined earlier, should include an assessment of status striving, but the particular operationalization we have chosen would not be applicable to other groups. In groups of executives, for example, this dimension would have to be operationalized differently.

Attitude toward pressure: Here we evaluate the answers to the question, "How do you feel about pressure? Do you like it, do you dislike it, or how do you feel?" The people who scored highest on this dimension seemed to "thrive on pressure."

The data used in assessing these dimensions were extracted from the two-hour semiformal interviews described earlier. The development of the achievement orientation measure--sometimes referred to as the AOR score--took the following course:

On the basis of tentative hypotheses, a coding sheet was assembled. Six cases with high and six cases with low serum uric acid levels were selected from among the first 80 cases collected in the course of this investigation. These were studied for the presence of meaningful dimensions that might be discriminating. Eleven cases were then selected at random in order to test whether the presence or absence of these dimensions could be assessed in other than extreme cases. On the basis of the analysis of these 23 cases we settled on the use of the seven dimensions described above.

Each of these seven subscales was scored by the same two raters on a three-point scale. The total subscale score is the sum of the two ratings on that dimension. This total subscale score can range from 2-6. The total index score of achievement orientation is the sum of these seven sub-scale scores. It can range from 14-42.

The semi-formal interview was originally not designed to include specific questions for assessing any of the seven dimensions. Thus we had to train ourselves in the coding of the interviews, in order to become attuned to the right clues.

Thirty-nine cases were coded independently by two raters without knowledge of the serum uric acid values. However, after every batch of five or six ratings the serum uric acid values in this group were made known and the raters discussed discrepancies in their assessments. We call this the "training group."

Then 38 interviews were coded independently by the two raters without discussion. We call this the "first rating group."

Half a year later independent achievement orientation ratings were made of the 22 professors on which no blood had been available at the time the original ratings had been made. In the meantime, of these 22 men 12 had provided the missing blood samples. These were, however, identified only by a laboratory number so as not to contaminate the behavior ratings on these cases. We call this the "second rating group."

The reliability of the achievement orientation score was assessed by computing the correlation of the achievement orientation ratings of the two raters and correcting this correlation coefficient by the Spearman-Brown formula for estimated reliability when the length of the test is doubled. As Guilford (1956) points out, the pooled judgments of two observers yield an increased reliability in the manner found for the doubling of a test, thus making the use of this particular formula applicable to our situation.

The work with these two additional groups contained much valuable data. If we could combine the three groups to get an N of 99 instead of 60 this would make a more detailed analysis possible. Thus we looked at the reliabilities of the various group ratings (Table 9).

TABLE 9.- Interrater correlations and estimated reliability coefficients for the various sub-samples

Group	Interrater correlations	Estimated reliability
Training Group N = 39	.63	.77
First Independently Rated Group (N = 38)	.87	.93
Second Independently Rated Group (N = 22)	.93	.96
Total Group N = 99	.82	.90

Even the lowest reliability coefficient (Training Group) seems adequate. This seems to indicate that most of the learning process took place in the analysis of the first 23 cases not included here. Therefore, it was decided to use all 99 cases in the analysis of the relationships between achievement orientation and other variables. The coefficients of estimated reliability of the seven sub-scales are presented in the appendix (Appendix H). The sub-scales "Pushing of Self" and "Achievement/Self-Confidence" have the lowest sub-scale reliability (r = .71).

It should be pointed out that the high level of reliability coefficients reflects partly the objective nature of some of the questions. The need to make inferences from the data in the interviews varied from question to question. Broken down by status groups the mean values of the achievement orientation index are distributed as shown in Table 10.

TABLE 10.- Mean values of achievement orientation scores distributed by status level

Status		Mean values of achievement orientation scores	
		N	Mean
Total sample		99	31.44
Assistant professor	(a)	38	30.18
Associate professor	(b)	22	29.59
Full professor	(c)	28	33.46
Administrator	(d)	11	34.36
All professors excluding administrators		88	31.08
Significance of difference among groups a to d		F = 4.25	$p < .01$

We see that there are significant differences among the status groups. Assistant and associate professors are significantly different from full professors and administrators. The differences between assistant and associate professors, and between full professors and administrators are not significant.

For further illustration we also want to present the sub-scale data. If we look at the distribution of the mean values we see that not all relationships are linear, and that, therefore, a Pearson correlation coefficient is not fully adequate to describe the data. For this reason we present the mean values and compare them by using analysis of variance in Table 11.

TABLE 11.- Mean values of the achievement orientation subscale scores distributed by status level

Sub-scale	Mean values of A O R subscale scores						
	Total	Asst. Prof.	Assoc. Prof.	Full Prof.	Admin.	F-ratio	
	N = 99	N = 38	N = 22	N = 28	N = 11	F	p
Achievement/ Self-Conf.	4.50	4.16	3.77	5.25	5.18	10.44	<.01
Drive	4.92	4.87	4.68	5.07	5.18	0.80	N.S.
Leadership	4.66	4.05	4.50	5.11	5.91	7.93	<.01
Range of Activities	4.07	3.40	3.96	4.79	4.82	7.10	<.01
Pushing of Self	4.88	4.95	4.86	4.75	5.00	0.19	N.S.
Emphasis on Research	4.38	4.68	3.82	4.79	3.46	4.02	<.01
Att. toward Pressure	4.06	4.08	4.00	3.79	4.82	2.19	N.S.

From the preceding table we see that administrators place the least emphasis on research. The tendency to lead and to manipulate other people, on the other hand, increases linearly and is highest in administrators. The same holds true for the significant increases in the range of activities in which a man engages. Achievement and self-confidence are lowest among the associate professors. There are no differences in attitude toward pressure, drive, and pushing oneself. Overall, associate professors show the least achievement orientation. The average score in this group is significantly lower than the average score for either full professors or administrators.

These data thus focus our interest on associate professors. It probably takes a great deal of energy, dedication, work commitment, and status striving to become a full professor or an administrator at a large university. On this basis the highest AOR scores are to be found, as expected, in those two groups. Compared with full professors and academic administrators, associate professors are a less selected group. Among these men there are a number who will not be promoted and for whom this associate position is the final one at the university. We assume that it is these people who are responsible for the comparatively low AOR score of the group. Assistant professors are clearly the least selected group, chosen probably more on the basis of promise and potential than on the basis of achievement. But an assistant professorship is not a final position at this university. Assistant professors have to strive in order to keep their jobs. Perhaps this is why they perform at an energy output level above that of the associate professors. However, this interpretation should be viewed with some caution, since we cannot be sure that the knowledge of a man's status did not influence our achievement orientation ratings, although the rating instructions were designed to minimize such contamination.

Meaning of the measure: In order to better understand the meaning of the achievement orientation score we computed first an intercorrelation matrix of each subscale with the AOR score and with one another. This matrix is presented below. All subscales correlate significantly with the achievement orientation score. However, these correlations are somewhat inflated because of the part-whole nature of the correlations.

TABLE 12.- Correlations between the subscales and the total achievement orientation score, and the intercorrelations among the sub-scales. (N = 87) (K-corrected)

	Achievemt. and Self-Confidence	Drive	Leadership	Range of Activities	Pushing of Self	Emphasis on Research	Attitude towards Pressure
Drive	.63						
Leadership	.49	.52					
Range of Activities	.45	.36	.45				
Pushing of Self	.35	.69	.34	.18			
Emphasis on Research	.35	.35	-.12	.04	.35		
Att. towards Pressure	.22	.32	.15	.08	.14	.04	
A O R Score	.79	.85	.64	.59	.67	.47	.47

Correlations significant at the .05 level or better are underlined

Since the average inter-correlation among the subscales is relatively small (r = .30), the AOR score does not constitute a factorially pure measure. On the other hand, 14 of the 21 intercorrelations among the subscales are significant, indicating that the subscales are not completely independent of each other, but measure to some extent a core of meaning common to all the subscales (Table 12).

Since none of the 21 intercorrelations among the subscales is larger than the correlation of that subscale with the AOR score, we conclude that there is no sub-clustering among the scales. Therefore, no collapsing of scales seemed indicated. We want to point out, however, that the correlations between the subscales and the total score are part-whole correlations and, as such, inflated.

The correlation between the AOR score and the K-scale of the MMPI is only an insignificant r = .12. This would seem to indicate that the professors' defensiveness had little effect on the ratings of achievement orientation. Some of the subscales, however, are significantly related to defensiveness, as was shown earlier.

The subscales Leadership, Achievement and Self-confidence, and Drive correlate highest with the AOR score. The subscale "Drive" is significantly related to every other subscale and it correlates so highly with the AOR score (r = .85) that the correlation is close to the estimated reliability of the AOR score. This seems to indicate that we were largely repeating in this scale, in summary, aspects of the other subscales.

In order to assess further the meaning of the AOR score we considered the correlation between AOR scores and age (Table 13). We hypothesized that the younger men at each status level would be those with the higher achievement orientation scores. The rationale for this is the assumption that status will be awarded on the basis of achievement. The greater the achievement orientation the earlier in life will a man have accumulated enough achievements to be given a certain status.

We believe that these age differences within status groups strengthen our conception of these ratings as reflecting achievement orientation and work related energy output.

TABLE 13.- Correlation between age and achievement orientation in the various status groups.

Status		Correlation between age and achievement orientation		
		N	r	p
Total group		87	.038	N.S.
Assistant professors	(a)	35	-.342	<.05
Associate professors	(b)	19	-.383	N.S.
Full professors	(c)	24	-.276	N.S.
Administrators	(d)	9	.338	N.S.
All professors excluding administrators		78	-.022	N.S.

We interpret this table in the following way. We see that in the strictly academic ranks there is a negative correlation between age and achievement orientation. For assistant professors this relationship is significant. However, among administrators the trend is reversed, though not significantly so. We suggest that it indicates high achievement orientation if a person reaches a given status level at a comparatively young age. This we would think holds true in general, but for the administrators there is an added factor. We feel that it indicates high achievement orientation if a man remains in an administrative position as his age increases. We assume that the correlations presented above would be larger if we knew not only the person's present age but also his age at the time of appointment to a given position.

Variables of the Psychological Environment

Quantitative overload

During the interview the professor was given a checklist of items which could conceivably cause pressure for him. This list of items, established on the basis of pretest interviews, was then factor analyzed.[3] Quantitative overload was one of the factors that emerged. Each item was rated on a four-point scale: "Not a source of pressure on my job" (1); "Hardly a source of pressure..." (2); "Somewhat a source of pressure..." (3); and "Great source of pressure..." (4). The items included in the quantitative overload scale were selected (a) because of their high factor loadings, (b) because they correlated less than .30 with items included in the qualitative overload scale, and (c) they seemed to assess the emotional quality we tried to catch. The quantitative overload scale consists of the following items:

1. Overwhelming work load; too many things need to be done.
2. Having things to do one really doesn't want to do.
3. Not enough time to think and contemplate.
4. Being torn by conflicting demands.
5. The feeling of never having any time.
6. Not being able to allocate one's time and resources as one would wish to.

We are presenting below the mean values of this quantitative overload scale for the total sample and for each status group separately. There are status differences. We saw earlier that on the achievement orientation subscale 'range of activities,' full professors and administrators ranked significantly higher. That we do not find such status differences with respect to the quantitative overload scale seems to suggest that we indeed measure more than just pure quantity of work load.

---

[3] The factor loadings of the items are given in Appendix I.

TABLE 14.- Distribution of the mean values of the quantitative overload scores in the total group and in the various status groups

Status		Mean values of quantitative overload	
		N	Mean
Total sample		122	2.39
Assistant professor	(a)	49	2.38
Associate professor	(b)	25	2.33
Full professor	(c)	33	2.46
Administrator	(d)	15	2.38
All professors excluding administrators		107	2.39
Significance of differences among groups a to d		$F = 0.17$	$p > .05$

Qualitative overload

This scale was derived from the same original set of items which was described above. The factor that came closest to our conception of qualitative overload contains the following items which form the qualitative overload scale:[4]

---

[4] The factor loading of the items is given in Appendix I.

1. The pressure to succeed.
2. Not measuring up to the demands of the job: lack of training or knowledge, or talent.
3. Pressure to keep up with one's colleagues.
4. The "publish or perish" race.

The rationale behind the use of these items as operationalization of a concept describing the discrepancy between personal skills and job demands lies in the assumption that unless the person perceives a negative discrepancy between his level of performance and that demanded by the job there is no reason for him to feel under pressure because of competition with others. We feel that the common variance of the items making up this scale best fits our conception of qualitative overload in spite of the indirect phrasing of the questions. The mean values for the total group and the various status sub-groups are presented in Table 15.

TABLE 15.- Distribution of the mean values of the qualitative overload scores in the total group and in the various status groups.

Status		Mean values of qualitative overload	
		N	Mean
Total sample		122	2.13
Assistant professors	(a)	49	2.55
Associate professors	(b)	26	2.13
Full professors	(c)	33	1.79
Administrators	(d)	15	1.54
All professors excluding administrators		107	2.22
Significance of the differences among groups a to d		F = 12.23	$p < .01$

The correlation between qualitative overload and status is $r = -.45$ ($p < .01$). We will discuss this correlation in greater detail in a later chapter. The correlation between quantitative and qualitative overload, corrected for defensiveness, is $r = .34$ which is significant at better than the .01 level. In trying to establish differential relations between the two kinds of overload and other variables, we will try to control for this common variance by partialling it out. Since we are controlling our relationships for defensiveness as a matter of course, this means that whenever we test the differences between correlations we are comparing second order partial coefficients.

Self as a source of pressure[5]

Originally we had intended to assess with this scale the relative weight of four agents of pressure: the profession, the institution, the colleagues, and the self. On each of the 16 dimensions we asked for an indication of whether or not pressure was associated with this dimension. If yes, we asked the professor to rank order the four agents of pressure. However, this was one of the questionnaires which a majority of the professors did not fill out properly. Frequently only one or two of the four agents of pressure were ranked. Sometimes there were only check-marks. Thus we had to redesign our scale. We ended up measuring only the degree to which the self was perceived as a source of pressure. We counted first the number of dimensions with respect to which pressure was experienced. We then counted the number of times the self was listed as the foremost source of pressure on these dimensions. A person's score was the percentage of dimensions on which he listed the self as the foremost source of pressure. A person who experienced overload with respect to all 16 dimensions and who indicated 8 times that the self was the greatest source of pressure got a score of "50". A person who experienced overload on only 8 dimensions and who indicated 4 times that the self was the greatest source of pressure got the same score of "50". Thus this scale assesses the importance of the self as a source of pressure in one person relative to the importance of the self as a source of pressure in other persons. The scale neglects the degree of pressure. The mean values of the various groups are distributed as shown in Table 16.

---

[5] For the questionnaire form see Appendix J.

TABLE 16.- Distribution of the mean values of the "self as a source of pressure" scores in the total group and in the various status groups

Status		Mean values of self as a source of pressure	
		N	Mean
Total sample		110	62.13
Assistant professor	(a)	46	57.65
Associate professor	(b)	22	65.34
Full professors	(c)	29	74.31
Administrators	(d)	13	45.31
All professors excluding administrators		97	64.38
Significance of the differences among groups a to d		$F = 4.62$	$p < .01$

We see that there are significant differences among the status groups with respect to the degree to which the self is perceived as the source of whatever pressure exists. The difference lies in the fact that administrators are clearly different from that academic rank from which most of them are chosen, the full professors. Full professors much more than administrators feel that they themselves are the agent which creates whatever pressure exists.

We also see that within the strictly academic ranks of assistant, associate, and full professor there is a linear increase in the degree to which the self is seen as the source of pressure. Within these three groups the correlation between status and self as a source of pressure is significant, $(r = .28;\ p < .01)$.

Perceived legitimacy of pressure[6]

In the theoretical discussion we pointed out that only those performance requirements will lead to a feeling of overload for which there are corresponding identity dimensions. We assume that one of the factors which influence whether or not a person will develop identity dimensions which correspond to required performance dimensions will be the degree to which he sees the performance requirements as legitimate. Thus, in this questionnaire we have tried to assess the degree to which the professor experiences the pressures he is subjected to as legitimate. Again, we presented the professor with his personal list of 16 dimensions and asked him to indicate on those dimensions which he experienced as pressure-causing, whether the pressure was legitimate or an unjustified imposition. The rating was made along a five-point scale ranging from "very legitimate" (5) to "very illegitimate" (1). We got the following distribution of mean values:

---

[6] For a sample of the questionnaire form see Appendix K.

TABLE 17.- Distribution of the mean values of the "perceived legitimacy" scores in the total group and in various status groups

	Mean value of perceived legitimacy	
	N	Mean
Total sample	111	4.40
Assistant professor (a)	46	4.40
Associate professor (b)	23	4.41
Full professor (c)	29	4.35
Administrator (d)	13	4.46
All professors excluding administrators	98	4.39
Significance of difference among groups a to d	F = 0.14	$p > .05$

Subjective public esteem[7]

It should be understood that we measured subjective public esteem in the occupational realm, but for the sake of convenience we will simply speak of subjective public esteem. This variable tries to assess the perception of the person of the degree to which relevant other persons esteem him. We asked the following question: "How are you presently evaluated professionally by those persons and groups in your field whose opinions matter to you?" The person made his assessments on a seven point scale ranging from "1" (low evaluation) to "7" (high evaluation). The distribution of mean values is shown in Table 18.

---

[7] For a sample of the questionnaire form see Appendix L.

TABLE 18.- Distribution of the mean values of the "subjective public esteem" scores in the total group and in various status groups

Status		Mean values of subjective public esteem	
		N	Mean
Total sample		108	5.28
Assistant professor	(a)	45	5.08
Associate professor	(b)	22	5.29
Full professor	(c)	28	5.40
Administrator	(d)	13	5.69
All professors excluding administrators		95	5.23
Significance of the difference among groups a to d		F = 2.29	$p > .05$

The analysis of variance does not show any significant differences among the status groups, although the value of F approaches significance. Since the mean values are linearly distributed, we correlated status and subjective public esteem. This correlation, though small, is significant ($r = .22$, $p < .05$) for the group as a whole. Since the F-test does not consider the ordering of the data, and since these mean values are linearly ordered, we feel that the correlation is a better indication than the F-test as to the nature of the relationship between status and subjective public esteem.

Variables Measuring Behavioral, Attitudinal, and Physiological Reactions

Occupational self-esteem

A sample questionnaire is found in Appendix M. The question we asked was in essence: With respect to the ability or attribute listed below, how satisfied or dissatisfied are you with your degree of skill or talent? The answers, distributed along a five-point scale, ranged from "I am very dissatisfied" to "I am rather satisfied." The answers were scored from -2 to +2. The score was the average rating of the 16 dimensions listed. Broken down by status groups, we find the following distribution of mean scores:

TABLE 19.- Distribution of the mean values of the "occupational self-esteem" scores in the total group and in various status groups

		Mean values of occupational self-esteem	
		N	Mean
Total sample		106	.463
Assistant professor	(a)	44	.286
Associate professor	(b)	21	.576
Full professor	(c)	28	.446
Administrator	(d)	13	.915
All professors excluding administrators		93	.400
Significance of differences among groups a to d		F = 2.48	$p > .05$

The F-ratio approaches significance but does not reach it. Thus we conclude that there are no differences in the degree of occupational self-esteem among the various status groups.

It should be pointed out that this measure of occupational self-esteem is an unweighted measure. Following the theoretical thinking of French and Sherwood (1963), we originally designed our measure of occupational self-esteem into two forms: weighted and unweighted. In order to weight a dimension by its importance, we asked the professor how important satisfaction or dissatisfaction on the given dimension was for his total occupational self-esteem. We then multiplied the evaluation by the importance and averaged it over 16 dimensions. The weighted and the unweighted measures of occupational self-esteem proved to be highly correlated ($r = .97$). On the basis of these findings we decided to restrict our analysis to the use of unweighted measures. We felt that in our case the weighting factor did not add any new information. On the other hand, the use of the weighted measure reduced the size of our sample. Some professors completed the evaluation part of the questionnaire but not the importance part. Consequently, they could not be assigned a weighted score, thus reducing the size of the sample. It should be noted that the correlation between the weighted and the unweighted measure of self-esteem is a part-whole correlation and, as such, inflated.

But there is also a theoretical argument which would lead us to predict a correlation between evaluation and importance. French and Sherwood (1963) state that there exists a force on the person in the direction of higher self-esteem. They point out that changing the importance of a given dimension is a way of increasing one's self-esteem. In order to keep his self-esteem high a person will rate the dimensions on which he holds a favorable self-attribute as important and he will rate those dimensions on which he is not able to attribute a favorable self-attribute to himself as unimportant. In a randomly selected subsample of ten, we correlated evaluation and importance within a person over 16 dimensions. The average correlation coefficient of these ten persons is $r = .34$ ($p < .01$).

Work hours

We assume that overload will have an effect on the number of hours the professor works. We decided to ask the question as to the number of hours worked of both the professor and his wife. We got the following distribution of answers:

TABLE 20.- Distribution of the mean values of the work hour reports in the total group and in the various status groups, and correlations between the work hour estimates of the husband with those of the wife for the total group and the various status groups

	Mean number of working hours per week					
	Husband		Wife		Correlation	
	N	Mean	N	Mean	r	p
Total sample	107	57.37	106	55.95	.27	<.01
Assistant professor (a)	42	57.48	42	57.48	.13	N.S.
Associate professor (b)	23	56.78	23	54.09	.32	N.S.
Full professor (c)	30	57.07	29	56.86	.60	<.01
Administrator (d)	12	58.92	12	52.00	-.69	<.05
All professors excluding administrators	95	57.18	94	56.46	.34	<.01
Significance of difference among groups a to d	F<1.00 N.S.		F=1.73 N.S.			

We see that the average professor reportedly works between 56 and 57 hours a week depending upon whether one asks his wife or himself. According to the findings of the Bureau of Labor Statistics (1961) this is considerably higher than the average of any of the groups listed. According to that survey, professionals work 41.3 hours a week and managers work on the average 49.5 hours. Our findings on professors do, however, correspond very closely to de Grazia's (1962) data on executives. He states that "a recent picture of the executive, pieced together by a brief survey, reveals that...the sum of these working hours--office, home, entertaining--comes to a total of 55 hours a week." (1962, p. 134). de Grazia's interpretation of the work hours of an executive applies equally well to our professors. He writes:

> The question is complicated by the nature of the executive's work.... To shape policy, determine goals, and create programs is not a function to be performed at stated hours of the day or while a man is seated in any particular spot. If the executive tends to picture himself as being constantly at work it may be in part because he feels under some pressure to give a tangible proof of his contribution. So much of what he does is not capable of being readily evaluated; it does not lend itself to being seen and immediately appraised by his associates. Hours of work thus become a vivid sign... of the extent of his labors.
>
> The main reason, however, why the executive works long hours... is that his way of life permits no clear-cut distinction between work and free time. (1962, p. 135)

What is striking in the preceding table is the significant negative correlation between the work hour estimates of administrators and their wives and the significant difference in mean values ($t = 2.49, p < .05$). At present we have no explanation for the negative correlation but we feel that we can interpret the difference in the mean values of the work hour estimates. We presume that the difference is due to a different conception of what means 'work'. An administrator's job includes a relatively greater amount of social functions and of traveling when compared with that of the strictly academic professor. It seems that the majority of administrators in our sample consider these functions work, while their wives seem to consider them play. Can this be substantiated?

We will assume that administrators who perceive the pressures of their job as self-induced will be less inclined to perceive the added functions of the job as work and will, therefore, report fewer work hours than those who feel that the pressures of their job are not self-induced. The correlation between work hours reported by the administrator and the degree to which the self is perceived as the source of pressure is r = -.30 (p >.05). If the wives report fewer work hours because they do not consider all activities of the husband as work then those administrators who perceive the pressures of their job as self-induced should show less discrepancy in comparison with their wives. In other words, the correlation between self as a source of pressure and the discrepancy between man and wife should be negative. This is the case. The correlation is r = -.42 (p >.05). In view of the very small N this might be taken a partial support, at least, of our interpretation, especially since these relationships are different among the strictly academic professors. Here the correlation between reported work hours and self as a source of pressure is r = .11 (p >.05), and the correlation between self as a source of pressure and discrepancy of estimate between husband and wife is r = .15 (p>.05).

Among the strictly academic ranks we see a linear increase in the strength of the correspondence between the work hour estimates of the husband with those of the wife. We interpret this as a consequence of the increasing familiarity of the wives with the job situation of their husbands. The wife of a newly appointed assistant professor may not yet know what aspects of his job the husband considers work. In contrast the wife of the full professor has learned that not everything done for the job is work or that her husband considers many things work that might appear to others as leisure, as for example reading the newspaper.

There is another variable by which we can compare the answers given by the husband with those given by the wife. This is the worry index, an adaptation of the measure used by Kahn et al. (1964) in their study of organizational stress. We get the following correlations for the correspondence between husband and wife (Table 21):

TABLE 21.- Mean values of worry scores as reported by the professor, his worrying as reported by the wife, and correlation between husband and wife in the total groups and in the various status groups

	Mean values of scores on the worry index					
	Husband		Wife		Correlation	
	N	Mean	N	Mean	r	p
Total sample	111	2.36	108	1.94	.37	$< .01$
Assistant professor (a)	46	2.55	43	2.12	.39	$< .01$
Associate professor (b)	22	2.30	23	1.87	-.02	N.S.
Full professor (c)	30	2.25	30	1.81	.37	N.S.
Administrators (d)	13	1.98	12	1.76	.33	N.S.
All professors excluding administrators	98	2.41	96	1.96	.36	$< .01$
Significance of the difference among groups a to d	$F = 5.04$ $p < .01$		$F = 3.29$ $p < .05$			

When we look at the mean values we see that husbands report a greater amount of worry than their wives report them as worrying. This finding is significant for the group as a whole and for all status subgroups except the administrators. When we look at the mean values of the different status groups we see that assistant professors worry the most. When we consider the reports of the husbands and of the wives we see that assistant professors worry significantly more than full professors and administrators.

Aside from the mean values, we find again a relatively low correspondence between the answers of the husband and of the wives. Especially curious is the lack of correspondence at the associate professor level. These relationships certainly suggest a fruitful field for further study, although the present work contains neither the theory nor the data to untangle them.

Cholesterol

We described cholesterol earlier as a waxy substance of the sterol group that is taken in with the diet or synthesized by the body. The normal concentration of cholesterol in the serum lies between 150 and 250 mg/100 ml. The Framingham study group (Kannel, et al., 1961) in their six-year follow-up report found that elevations of serum cholesterol above 245 mg/100 ml. provide a threefold increased risk for the occupance of coronary heart disease in men.

When compared with serum uric acid, cholesterol levels show a stronger relationship to age. Moses (1963) states on the basis of the available evidence that "in the middle twenties, males begin to demonstrate a steady increase in the total serum cholesterol levels and the slope of this rise becomes steeper in the fifties, levelling off in the mid-sixties." (1962, p. 149). In our sample the correlation between age and cholesterol is $r = .19$ ($p < .05$). Cholesterol does not seem to be related to status, at least not in our sample ($r = .11$, $p > .05$). Furthermore, according to the evidence cited by Moses (1963), cholesterol does not seem to be related to body weight. We obtained the same findings. In our sample cholesterol and overweight are not correlated ($r = .01$, $p > .05$).

Determinations of cholesterol levels are done as a matter of course during the periodic health examinations of the faculty. The collection is under the supervision of a research cardiologist. The method used is that by Mann (1961). It is basically an extension of the method developed by Abell et al.(1952). It is a photometric method using a solution of iron and sulfuric and acetic acid as a reagent, and measures the changes in optical density. The relation of optical density and cholesterol concentration is linear. The technical error of this method by Mann is 11.0 mg/100 ml.

Obesity

Overweight was determined by using the table of desirable weights published by the Metropolitan Life Insurance Company (1959). This table contained desirable weights for given heights for men 25 years and over. The table was broken down into weights for small, medium, and large-frame men. For each entry a range of weights was given. Since we did not have any measurement of the body frame, we used the entry "medium frame" and took the upper value of the range as the desirable weight.

This desirable weight was compared with the actual weight measured during the examination. The measurements and weights in tables of the Metropolitan Life Insurance Company were given for clothed men. The measurements and weights from the faculty health examination were also taken while the professor was clothed. Thus the measures are comparable. From the discrepancy, positive or negative, between desirable weight and actual weight, the percentage of overweight or underweight was computed.

On the average, the men in our sample are 8.3 per cent overweight. However, only 16.4 per cent of the men in the sample are 20 per cent or more overweight and could be called obese. Overweight is neither related to age ($r = .10$, $p > .05$) nor to status ($r = .07$, $p > .05$).

Blood pressure

Blood pressure was measured with a mercury manometer by a registered nurse while the patient was in a sitting position after a five to ten-minute waiting period. The mean diastolic blood pressure in this group is 79. The correlation between diastolic blood pressure and age is

$r = .30$ ($p < .01$). The correlation with status is $r = .20$ ($p < .05$), but if we control this correlation for the effects of age, the correlation drops to $r = -.03$ ($p > .05$).

In the opinion of the medical staff of the university health service, we are dealing with a group of men who enjoy above average health and about whose health state the doctors are little concerned. Blood pressure, cholesterol, and serum uric acid are well within the normal range. The slight average overweight is apparently no reason for a doctor's concern.

Statistical Procedures

Computing the Differences between Correlations

A word about the method for computing the differences between the correlation coefficients is in order. The simplest formula is that relying on a z-transformation of the coefficients as reported by Guilford (1956, p. 194).

$$z = \frac{z_1 - z_2}{\sqrt{\frac{1}{N_1 - 3} \quad \frac{1}{N_2 - 3}}}$$

In comparing coefficients of correlation three situations can arise: (1) Comparison of correlation coefficients relating the same two variables measured in two different populations. This is the case for which the above formula is most applicable. The correlation coefficients to be compared are independent of each other. (2) Comparison of two correlation coefficients measured in the same population but assessing the relationships of two pairs of variables r_{12} and r_{34}. In this case the amount of error introduced depends on the correlations r_{13}, r_{14}, r_{23}, r_{24}.

In the present study this problem does not arise. (3) We are confronted with the third situation, comparing two correlation coefficients measured in the same population when one variable is common to both coefficients, r_{12} vs. r_{13}. In this case the error introduced when using the formula for uncorrelated correlations depends on the size of r_{23}. There exists a long and cumbersome formula for the comparison of coefficients in this third case (Guilford, 1956).

The z-transformation formula is simpler. We decided to use it on the basis of the following argument: If in situation 3 the error depends on the correlation r_{23}, then correcting gor this error by the use of partial correlation should remove that source of error. This is what we did. Whenever we compared two coefficients of correlation, these were partial coefficients of correlation. To check on the correctness of this assumption we computed several differences between correlations using both methods, the z-transformation formula applied to partials and the decidedly more cumbersome method outlined by Guilford. The more involved procedure gives somewhat more conservative values which, however, do not differ enough from the simpler approximation to cause concern.

One-tail Test Versus Two-tail Test

In order to avoid entanglement in the discussion about the use of one-tail and two-tail tests, we decided to report p-values based on two-tail tests throughout this study. This makes our statements conservative and leaves it to the reader to decide whether a one-tail test is appropriate.

Correcting for Defensiveness

There is the feeling among psychometricians that the problem of correcting for defensiveness has not yet been solved satisfactorily. The problem is that it is difficult to know what effects the correction measures really have. In this study we had the feeling that some means was needed to lower the danger that our correlation reflected not the relationship between the variables but only the distorting influence of the tendency to appear in a favorable light. On the other hand, it may very well be a reflection of the importance for self-esteem if a person tries to defend against the realization that he is not qualified to handle an assigned job. Partialling this defensiveness out may in effect overcorrect and hide a relationship. Moreover, the K-scale which we used as a measure of defensiveness was especially designed as a suppressor scale to be used in the MMPI.

For these reasons we present in Appendix U a correlation matrix of the relationships among the data not corrected for defensiveness as well as a matrix of the corrected data (Appendix V). We are aware that here lies a problem for research, but we felt that we needed a corrective measure and that by using the K-scale we would--if anything--err in the direction of being too conservative.

- - - - - - - - -

This concludes the presentation and description of those variables that were used in this study in order to test our hypotheses or in the course of the discussion. But the interviews with the professors provided a rich amount of further data. We want to present some of these data in the next chapter in order to give the reader a better feeling for the nature of the group from which we drew our data. Findings presented in the next chapter do not belong into the main body of the study. We will not attempt to interpret them at any great length. But they are interesting and can provide a better understanding of what professors are like.

CHAPTER IV

DESCRIPTION OF THE SAMPLE

Distribution of the Sample by Academic Rank and Department

In our sample are 49 assistant professors, 26 associate professors, and 47 full professors. Of those who refused, 3 were assistant professors, 5 associate, and 4 full professors. Fourteen of the 15 administrators were full professors; one was an associate professor. The administrators are not separated in the tabulations of this chapter; their group is too small to allow for meaningful analyses of differences in frequency distribution.

TABLE 22.- Comparison of the status distribution of the sample with the status distribution of the university as a whole

	Assistant professor	Associate professor	Full professor
	%	%	%
Distribution of the sample	40.2	21.3	38.5
Distribution within the university	25.9	27.9	46.2

As can be seen from Table 22, the high ranks are under-represented in our sample, while assistant professors are over-represented. The over-representation of assistant professors occurred because at the beginning of the academic year--when the data were collected--it is the job of the health service to examine all those who have become eligible but have not had an examination. Assistant professors make up a large part of this group. Originally, we had hoped to collect equal numbers in the academic ranks. This turned out to be impossible.

The bias introduced into the study by this selection lies in the fact that only full and associate professors are groups settled in their jobs. In the assistant professor group there is a comparatively greater number of men who are not yet fully acquainted with the job, because of the recency of their appointments. To evaluate the bias more specifically is very difficult since no two situations were alike. Some of these men were new assistant professors but had been on the faculty as instructors. Others had been assistant professors for several years but at different institutions.

In spite of the over-representation of assistant professors, the sample does cut across departments and schools as can be seen from Table 23.

Distribution of the Sample by Age and Marital Status

The vast majority of our professors are married: 94% or 115 out of 122. One professor is divorced, one is widowed. Five professors are single.

The mean age in our group is 42.9 years, ranging from as young as 25 years to men 69 years of age and at the threshold of retirement. This mean age coincides with the mean age of the University as a whole. Table 24 compares the sample age distribution with the 1961-62 University age distribution.

TABLE 23.- Distribution of the total group and the various status groups by department and scientific discipline.

Department*	Total (122)		Assistant (49)		Associate (26)		Full (47)	
	FRE.	%	FRE.	%	FRE.	%	FRE.	%
Physical sciences	14	11.5	6	12.2	2	7.7	6	12.8
Life sciences	7	5.7	2	4.1	1	3.8	4	8.5
Social sciences	14	11.5	10	20.4	0	0.0	4	8.5
Bus. Ad./Econ.	12	9.8	5	10.2	0	0.0	7	14.9
Medicine	14	11.5	5	10.2	3	11.5	6	12.8
Engineering	19	15.6	7	14.3	6	23.1	6	12.8
Liberal Arts	17	13.9	10	20.4	4	15.4	3	6.4
Public Health	7	5.7	1	2.0	4	15.4	2	4.3
Music	8	6.6	1	2.0	3	11.5	4	8.5
Education	5	4.1	2	4.1	2	7.7	1	2.1
Other	5	4.1	0	0.0	1	3.8	4	8.5
TOTAL	122	100.0	49	100.0	26	100.0	47	100.0

*For a description of the coding categories see Appendix N.

TABLE 24.- Age Distribution of the Sample and its Various Status Subgroups, and Age Distribution at the University of Michigan in 1961-62

Status	N	Mean age Sample	Mean age University
Total group	122	42.9	43.0
Assistant professor	49	33.3	37.0
Associate professor	26	45.7	43.0
Full professor	47	51.3	52.0

Wilson (1942) reports that in 1928-29 at the University of Chicago the average age of full professors was 51.4; of associate professors 44.0; and of assistant professors 36.2. He also gives for that year 32.2 as the average age of instructors. The age distribution of our sample corresponds fairly closely to these two comparison distributions at least at the levels of associate and full professors. The comparatively young age of the assistant professors in our sample is again, at least in part, a consequence of collecting the data at a time when the staff of the health service concentrated on those who had never had an examination before. Another reason partially responsible for the relatively younger age of the assistant professors may be the growing trend to hire men with Ph. D.'s directly as assistant professors and to make instructor a rank held by graduate students close to receiving the doctoral degree. Wilson's age for instructors in our group has become the age of the assistant professor.

Attitudes Toward Work

The information on attitudes toward work comes from a coding of the semiformal interviews. Since the group of the administrators is so small, we decided to tabulate the answers according to academic rank rather than to use administrators as a separate group.

This is a study of work pressures. But do professors themselves report that they are working hard or do they see themselves in a secluded bay of life leading a leisurely, serene existence? We asked the question: "In general, do you think you are working hard or not very hard?" We found the following distribution of answers:

TABLE 25.- Distribution by status of the answers to the question: "In general, do you think that you are working hard or not very hard?"*

	Total Sample		Assistant Professor		Associate Professor		Full Professor	
	FRE.	%	FRE.	%	FRE.	%	FRE.	%
1. Very Hard	21	17	6	12	5	19	10	21
2. Hard	38	31	12	25	10	39	16	34
3. Qualified "Hard"	21	17	11	22	5	19	5	11
4. No clear answer	32	26	13	27	6	23	13	28
5. Not Hard	10	8	7	14	0	0	3	6
TOTAL	122	100	49	100	26	100	47	100

*For a description of the coding categories see Appendix O.

An inspection of the table shows that there is not relationship between academic rank and the feeling that one is working hard. The chi-square for six degrees of freedom--collapsing groups 1 and 2, and 4 and 5--is 5.89, which is not significant. It would be interesting to compare these findings with the distribution in other populations, but we don't know of any study which has asked the question in the same way.

We see also from the preceding table that 65% of the professors in our sample feel that the way they work can be described as "working hard". But why do they do it? Would professors continue to work even if they did not have to work? Why do they want to work? We asked this question in the interview and a tabluation of the answers provides the following picture:

Would Professors Work Even if They did not Have To?

We asked the professors the same question Morse and Weiss (1955) asked in their national sample of 401 employed men: "If by some chance you inherited enough money to live comfortably without working, do you think you would work anyway, or not?" The distribution of answers is presented in Table 26.

TABLE 26.- Distribution by status of the answers to the question: "If by some chance you inherited enough money to live comfortably without working, do you think you would work anyway or not?

	Total Sample		Assistant Professor		Associate Professor		Full Professor	
	FRE.	%	FRE.	%	FRE.	%	FRE.	%
1. Yes	104	85	39	80	23	88	42	89
2. Qualified "yes"	17	14	10	20	3	12	4	9
3. Don't know	1	1	0	0	0	0	1	2
4. No	0	0	0	0	0	0	0	0
TOTAL	122	100	49	100	26	100	47	100

Chi-square = 2.07 d.f. = 2 p > .05 (collapsing groups 2 to 4)

We see that 85% answer the question with an unequivocal 'yes'. This finding corresponds closely to the one by Morse and Weiss who found 86% of those in professional positions would continue to work, even if they did not have to.

What Motivates Professors to Work?

We asked the question: "Why would you work (if by some chance you inherited enough money to live comfortably without working)?" The coding categories to this and the other tables are fully explained in the Appendix. We got the following distribution of answers:

TABLE 27.- Distribution by status of the answers to the question: "Why would you work?"*

	Total Sample		Assistant Professor		Associate Professor		Full Professor		p-value of chi-square
	FRE.	%	FRE.	%	FRE.	%	FRE.	%	
Nature of the work	71	58	29	59	15	58	27	57	N.S.
Funktionslust	64	52	18	37	17	65	29	62	<.05
Satisfaction of extrinsic needs and values	57	47	24	49	17	65	16	34	<.05
Job pressure, overload	46	38	19	39	9	35	18	38	N.S.
Work as moral value	34	28	10	20	9	35	15	32	N.S.
Success striving	27	22	12	24	6	23	9	19	N.S.
Social Pressure	7	6	3	6	1	4	3	6	N.S.
Other	8	7	2	4	0	0	6	13	N.S.

*For a description of the coding categories see Appendix P.

By "Funktionslust", a descriptive term used by one of our subjects, we mean the simple enjoyment of activity, of being active and busy. We see that this motive is significantly stronger in associate and full professors. We would interpret this as a result of prolonged socialization. The job becomes more and more the life, so much so that it may be difficult to say exactly why one works, but expressing the clear feeling that something would be missing, that life would be impoverished, if one could not work anymore. Another reason that may account for this difference is the fact that associate and full professors have arrived, relative to assistant professors. They are in the goal region in Lewin's terms. Having arrived may make it more difficult to specify specific goals one wants to reach.

A second significant difference in reported work motivation is found with respect to the motive to satisfy extrinsic needs and values, such as money, security, other amenities. This motivation is strongest among associate professors, which is understandable when we think that associate professors are likely to be of an age where the financial pressures are greatest. Their children are in college or approaching college; a larger house has to be maintained and a certain living style is expected. All this makes the satisfaction of extrinsic needs such as money more important. The average age of the associate professor, as we saw, is 46 years in this group.

For comparison we present in Table 28 the distribution of answers Morse and Weiss (1955) obtained to the same question:

TABLE 28.- Reasons for continuing working (Morse and Weiss, 1955)

Question: "Why do you feel that you would work?

	Number	Per cent
Positive reasons		
Enjoy the kind of work	27	9
To be associated with people	4	1
To keep occupied (interested)	93	32
Justifies my existence	14	5
Gives feeling of self-respect	13	5
Keeps individually healthy, good for person	30	10
Other	4	1
Total positive reasons	185	63
Negative reasons		
Without work, would:		
Feel lost, go crazy	42	14
Feel useless	5	2
Feel bored	11	4
Not know what to do with my time, can't be idle	29	10
Habit, inertia	17	6
To keep out of trouble	3	1
Other	2	0

The coding categories in the two studies are not comparable but it is interesting to note the great difference between the categories

'Nature of the work' of this study and 'Enjoy the kind of work' taken from Morse and Weiss. It seems a fair inference that compared with the general population, professors enjoy a clear advantage in the degree to which they are able to like the kind of work they are doing. On the other hand, if we compare 'Funktionslust' with all the Morse and Weiss categories which we subsumed under that one term 'Funktionslust' we find that this unspecified response is given with equal frequency by professors. If we add up the Morse and Weiss categories "To keep occupied", "Feel lost", "Feel bored", "Can't be idle" we see that 60% of the men in their sample give these reasons as compared with 52% of the professors.

Job Satisfaction

We can go on and ask whether or not the job satisfies these motives.

Do professors like their jobs? The only possible answer to this is an unequivocal 'yes'. The number of professors who are seriously dissatisfied with their lot is extremely small. On the other hand, many spontaneous comments indicate satisfaction. "I have the world by the tail"; "I should pay the university"; "I have made a well paying job out of what would have been my hobby anyway." Such comments are in the majority. Specifically, we asked the question; "(If by some chance you inherited enough money to live comfortably without working), would you still keep doing the same type of work you are doing now?" From Table 29 below we see that more than half of all the professors in our sample would continue exactly what they are doing now, even if they were completely independent financially. And this finding applies to all status levels without any marked differences. If we include the group who wants only minor changes--somewhat less administration or somewhat more research--the percentage of those who would continue in the same way jumps to 82%. Again, this applies across all status levels.

TABLE 29.- Distribution by status of the answers to the question: "(If by some chance you inherited enough money to live comfortably without working), would you still keep doing the same type of work you are doing now?"

	Total Sample		Assistant Professor		Associate Professor		Full Professor	
	FRE.	%	FRE.	%	FRE.	%	FRE.	%
1. Yes	66	54	26	53	14	54	26	55
2. Qualified "Yes"	34	28	14	29	7	27	13	28
3. Don't know	11	9	4	8	3	12	4	9
4. No	11	9	5	10	2	8	4	9
TOTAL	122	100	49	100	26	100	47	100

Chi-square = 0.04 d.f. = 4 $p > .05$ (collapsing group 2 to 4)

Rewards of the Job

What specifically are the rewards which account for this high degree of job satisfaction in our group? We asked each professor: "Could you tell me specifically what are the things you like about your job?" We used coding categories for this question that are different from those that describe work motivation. It might be argued that it would have been better to use the same coding categories for both questions, since what is rewarding on the job should also be a motivating factor. We felt, however, that specific coding categories--which are described in the Appendix--fitted the data better. Response to the question of job rewards yielded a wide variety of answers. The eight most frequently mentioned categories are the following:

TABLE 30.- Distribution by status group of the answers to the question: "Could you tell me specifically what are the things you like about your job?"*

	Categories of job rewards								
	Total Sample		Assistant Professor		Associate Professor		Full Professor		p-value of chi-square
	N - 122		N - 49		N - 26		N - 47		
	FRE.	%	FRE.	%	FRE.	%	FRE.	%	
Freedom and independence	79	65	34	69	16	62	29	62	N.S.
Interpersonal relations	71	58	27	55	13	50	31	66	N.S.
Nature of the work	67	55	26	63	13	50	28	60	N.S.
Teaching and teaching situation	61	50	31	63	13	50	17	36	<.05
Working conditions	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<.05
Tangible rewards	44	36	15	30	10	38	19	40	N.S.
Academic way of life	39	32	16	33	8	31	15	32	N.S.
Research and research situation	37	30	16	33	8	31	13	28	N.S.

*For a description of the coding categories see Appendix Q.

Among these specific job rewards we find two categories that show significant variations with status. There is a linear decrease from assistant to full professor in perceiving teaching and the teaching situation as a job reward. At present we have no explanation for this finding but note it as a suggestion for future research.

Working conditions are most frequently mentioned as a job reward by associate professors. Again it seems difficult to suggest a plausible explanation without further investigation of work areas which are not part of this study.

It is interesting to note that 36% of the men in our sample mention tangible rewards (salary, tenure, vacations, etc.) as job rewards. This is quite in contrast to earlier findings. Flexner writes in 1930 (quoted from Wilson, 1942, page 146):

> The truth is that, with exceptions, of course, the American professorate is a proletariat, lacking the amenities and dignities they are entitled to enjoy.

In 1959 Ruth Eckert, et al. in reporting the results of a survey of satisfactions and dissatisfactions of 576 faculty members in 4-year colleges and universities state that 47.2% of the sample mentioned poor salary as a major job dissatisfaction. In our sample complaints about money and tangible rewards occurred so infrequently that it did not seem worthwhile to code them in a special category. This, of course, is not to mean that professors are no longer interested in money, or that they would not leave for higher salaries. It does, however, indicate that between 1930 and 1965 worries about money have ceased to be worries about necessities and have become worries about amenities.

Leisure Pattern Among Professors

But with all this emphasis on the job how does the pattern of leisure activities look? What do professors do when they are not at the job? We asked this question only of the wives of professors in several different forms. We asked, "When your husband comes home, what are some of the ways in which he relaxes?"; and "Could you please tell us how your husband usually spends his weekends?" We coded the responses to each of these questions into 12 categories which are described in the Appendix. The results, listing the five categories most frequently mentioned for each of the two questions, are presented in Tables 31 and 32.

TABLE 31.- Distribution by status of the answers to the question: "When your husband comes home what are some of the ways in which he relaxes?"*

Activity	Total Sample		Assistant Professor		Associate Professor		Full Professor		p-value of chi-square
	N = 107		N = 42		N = 24		N = 41		
	FRE.	%	FRE.	%	FRE.	%	FRE.	%	
Reading for relaxation	99	92	37	88	20	83	42	100	N.S.
Plain relaxing	72	67	27	64	15	63	30	71	N.S.
Spectator relaxation	69	64	27	64	15	63	27	64	N.S.
With the family	61	56	33	79	15	63	13	31	<.05
Hobbies	42	39	11	26	12	50	19	45	N.S.

TABLE 32.- Distribution by status of the answers to the question: "Could you please tell us how your husband usually spends his weekends?"*

	Total Sample		Assistant Professor		Associate Professor		Full Professor		p-value of chi-square
	FRE.	%	FRE.	%	FRE.	%	FRE.	%	
Professional work	72	67	37	88	15	63	20	48	<.05
Socializing	69	64	26	62	13	54	30	71	N.S.
Spectator relaxation	62	57	26	62	13	54	23	55	N.S.
Household maintenance	61	56	22	52	18	75	23	55	N.S.
Family	56	52	25	60	14	58	17	40	N.S.

*For the description of the coding categories see the Appendix B.

From the two tables above we get further confirmation of the work committment of university professors. More than anything else it is professional work that fills the weekends of the professor.

There is a significant linear decline in the use of the weekend for professional work as we go from assistant to full professors. This finding may raise doubts about our earlier interpretations where we stated that "job" became "life" more for full professors than for assistant professors. Two explanations are possible. The statement that younger men spend more of their leisure hours on professional activities can be a reflection of the wife's frustration of not having the husband available over the weekend. Such frustration should be greatest among the younger ones who presumably are less adjusted to the fate of a professor's wife than the older ones. Younger wives tied down by the presence of younger children are also more likely to be those who have less diverting interests and are thus more dependent on their husbands for companionship and stimulation. The other explanation that occurs is that assistant professors spent more of their leisure hours on the job for extrinsic reasons, teaching extension courses for money, or that they work longer hours in order to get ahead faster. Out of this will develop over the years the feeling that the job is one's life. But it is our impression from reading the interviews that among assistant professors the feeling is still very much alive that one could also do other things besides teaching and research. The hope to remain a well-rounded person, to maintain a balance between the job and other interests, is clearly more prevalent in younger men.

- - - - - - - - - - - - - -

We hope that the preceding presentation has given the reader a better understanding of the kind of group we are dealing with. In the next chapter we will present the data relating to the hypotheses stated earlier.

CHAPTER V

RESULTS: OVERLOAD AND ITS RELATION TO STATUS AND TO PSYCHOLOGICAL VARIABLES

In the second chapter we have tried to outline the theoretical relationships between the main variables of this study. In this chapter and the next we will present the data and discuss the results. We will begin by looking at the data relating to overload.

The Relationship Between Overload, Subjective Public Esteem and Occupational Self-esteem

Before we go into a more detailed presentation it might help to give the data in the form of a correlogram.

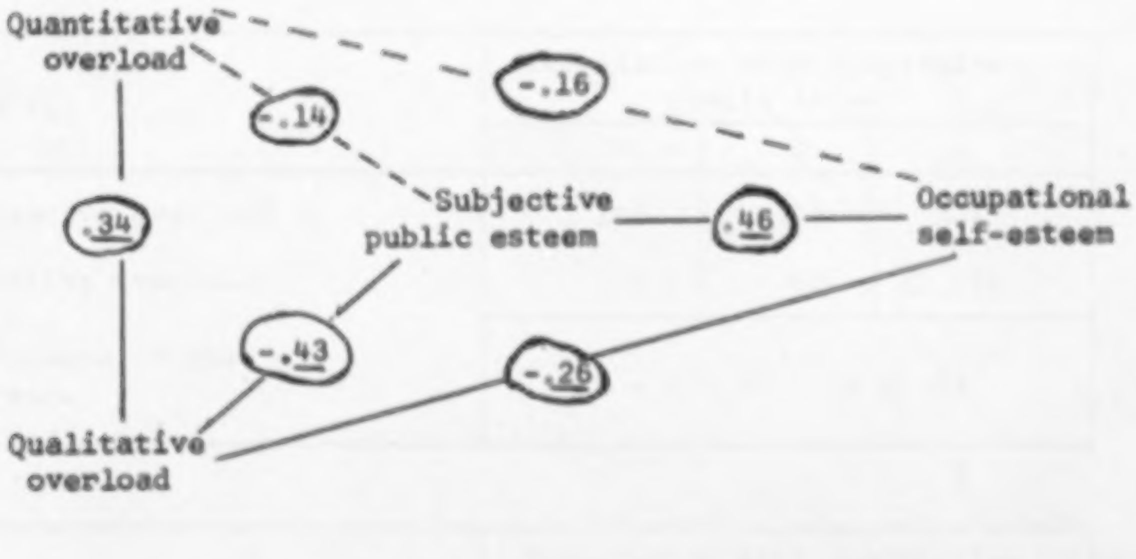
Quantitative overload
-.16
-.14
.34
Subjective public esteem
.46
Occupational self-esteem
-.43
-.26
Qualitative overload

Fig. 6.- Correlogram presenting the network of relations between the variables: quantitative overload, qualitative overload, subjective public esteem, and occupational self-esteem. Underlined correlations are sigificant at the .05 level or better.

When we present the same data in tabular form we get the following picture:

TABLE 33.- Correlation between overload, subjective public esteem, and occupational self-esteem.

33 (a)	Correlation with occupational self-esteem		
	N	r	p
Quantitative overload	105	-.16	N.S.
Qualitative overload	105	-.26	$< .01$
Subjective public esteem	103	.46	$< .01$
Significance of difference between quantitative and qualitative overload	$z = 0.99$ $p > .05$		

33 (b)	Correlation with subjective public esteem		
	N	r	p
Quantitative overload	105	-.14	N.S.
Qualitative overload	105	-.42	$< .01$
Significance of the difference	$z = 3.23$ $p < .01$		

33 (c)	Correlation with qualitative overload		
	N	r	p
Quantitative overload	105	.34	$< .01$

In our theoretical discussion we started out by hypothesizing that quantitative overload will be in a relationship of interdependence with qualitative overload. This hypothesis seems supported. The correlation between the two measures of overload is significant.

Next we made the assumption that how well a professor performs various activities will be more important than how much time he spends on each activity; i.e., the quality of his performance will be more important than the quantity. We assumed this to be a norm of the academic community. The theory states that the norms of a group are reflected in the public evaluation of the group members. If a norm plays an important role in the evaluation of a person, then adherence to that norm should contribute a great deal to the evaluation. In other words, we should find a stronger negative correlation between qualitative overload and subjective public esteem than between quantitative overload and subjective public esteem. As we see from the table, this hypothesis is supported. However, these data from the group as a whole obscure an interesting difference within our sample which is that this relationship holds true only for professors but not for academic administrators. We will come back to this shortly.

We further predicted that the relationship between quantitative overload and occupational self-esteem will be weaker than the relationship between qualitative overload and occupational self-esteem. This hypothesis is only partly confirmed. There does exist a significant negative correlation between qualitative overload and occupational self-esteem, while the relationship between quantitative overload and occupational self-esteem is not significant. However, the difference between the two correlations is not significant.

This lack of a significant difference could, of course, be due to a weakness of the measure. But it should be remembered that in order to compare the correlation of qualitative overload and occupational self-esteem with that between quantitative overload and self-esteem we controlled for the correlation between the two measures of overload by partialling it out. Thus, we tried to control for an overlap of the measures of qualitative and quantitative overload. But there are shortcomings of each individual measure. For example, the items in our indices may not be the ones best suited to assess either quantitative or qualitative overload. Consequently, we cannot rule out the possibility that the lack of significant difference between the correlations is due to shortcomings of our measures.

If we assume for the moment that the insignificance of the difference is not only due to shortcomings of the measures, then what does this suggest for the theoretical hypothesis? We derived this hypothesis via the assumption that in a situation of quantitative overload an existing discrepancy is not perceived as indicating anything important about the self, that the self would not be evaluated in terms of quantitative discrepancies. The findings presented lend partial support to this assumption, although the lack of a significant difference between the correlations of quantitative and qualitative overload with self-esteem prevent us from drawing definitive conclusions. The possibility that there does exist the tendency to evaluate the self on the basis of quantitative discrepancies cannot be ruled out completely.

Overload and the Nature of the Sample

In order to account for the lack of significant difference between the correlations, we want to explore the empirical finding that the tendency to evaluate the self on the basis of quantitative discrepancies seems tied to a particular sub-group within our sample. We find that professors do not evaluate the self on the basis of quantitative discrepancies but that administrators do so evaluate themselves. In order to show this we present the correlogram of the relationships between overload, subjective public esteem, and occupational self-esteem separately for professors and for administrators.

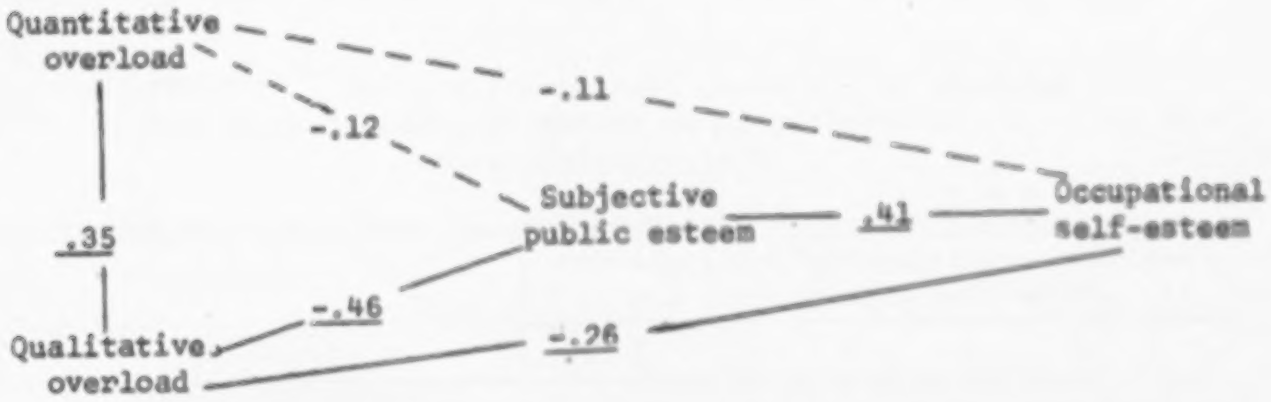
Quantitative overload
-.11
-.12
.35
Subjective public esteem
.41
Occupational self-esteem
-.46
Qualitative overload
-.26

Fig. 7.- Correlogram presenting the relationships between overload, subjective public esteem, and occupational self-esteem in professors, excluding administrators. Correlations significant at the .05 level or better are underlined.

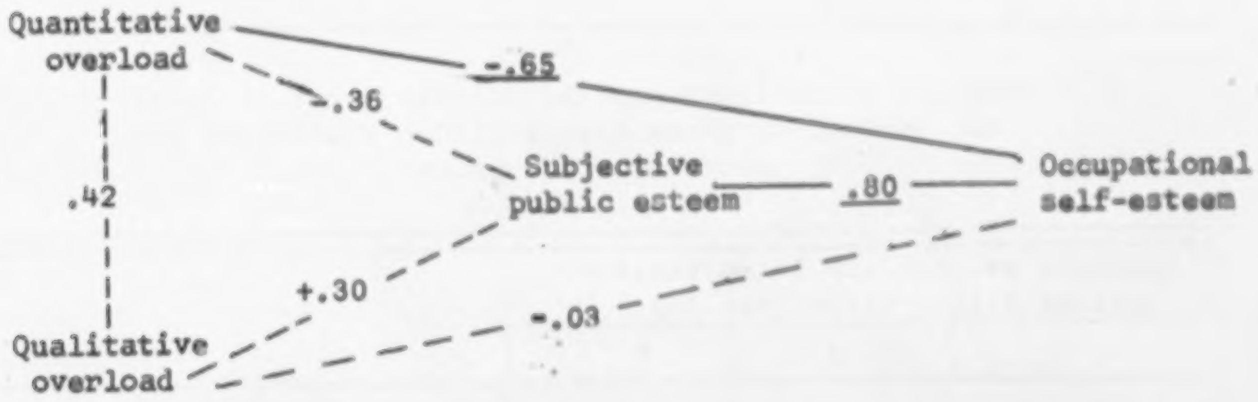
Quantitative overload
-.65
.36
.42
Subjective public esteem
.80
Occupational self-esteem
+.30
Qualitative overload
-.03

Fig. 8.- Correlogram presenting the relationships between overload, subjective public esteem, and occupational self-esteem among administrators. Correlations significant at the .05 level or better are underlined.

When we look at the tabular presentation of these data (Table 34) we see that quantitative overload affects the occupational self-esteem of administrators significantly more strongly than it does the occupational self-esteem of professors. Possible explanations for this finding will be presented later. Here we want to demonstrate the need to separate the administrators from the professors in any analysis of overload and its relationships. We also see from a comparison of the two correlograms that not only quantitative overload and occupational self-esteem relate differently but also qualitative overload and subjective public esteem. Below, we present these differences in the form of two tables.

TABLE 34.- Correlation between quantitative overload and occupational self-esteem among professors and among administrators.

	Correlation of quantitative overload and occupational self-esteem		
	N	r	p
Among professors excluding administrators	92	-.11	N.S.
Among administrators	13	-.65	$< .05$
Significance of the difference	$z = 2.01$ $p < .05$		

TABLE 35.- Correlation between qualitative overload and subjective public esteem among professors and among administrators

	Correlation of qualitative overload and subjective public esteem		
	N	r	p
Among professors excluding administrators	92	-.46	$< .01$
Among administrators	13	.30	N.S.
Significance of the difference	$z = 2.43$ $p < .05$		

It seems clear to us from a consideration of these data that 'quality of performance' has a different meaning for administrators and for professors. The assumption that quality of performance as defined by publications and competition with colleagues is a more important aspect of subjective public esteem than keeping up with the work load holds only for professors but not for administrators. Among academic administrators quantitative overload is significantly more strongly related to occupational self-esteem as Table 36 shows.

TABLE 36.- Correlation between overload and occupational self-esteem among administrators

	Correlation with occupational self-esteem		
	N	r	p
Quantitative overload	13	-.65	$< .05$
Qualitative overload	13	-.03	N.S.
Significance of the difference	$z = 2.76$	$p < .01$	

It seems that "performing well" for the administrators means "keeping a clean desk" and that consequently an administrator's occupational self-esteem is more affected by a perceived lack of keeping up with the work load than is the occupational self-esteem of a professor.

The notion that those aspects of the job that went into our index of qualitative overload have a different meaning for administrators than for professor finds further support when we look at the correlation between qualitative overload and subjective public esteem ($r = .30$). Admittedly, the correlation is not significant, but with this limitation in mind we believe that the following interpretation has merit: A professor at an institution like this one is expected to publish. He is expected to compete with his colleagues for professional recognition. The group expectations for an administrator are different. However, it seems that an academic administrator who in spite of his different obligations continues to strive for professional recognition gains added esteem from the members of his reference group. A dean or even a chairman who continues to feel the pressure of the "publish or perish" norm does in a way more than is expected of him. In the eyes of his reference group he makes it harder on himself than he has to, and this seems to bring him an increase in esteem. Reasonable as we feel this interpretation is, we point out again that this is the interpretation of a non-significant correlation and that, therefore, it should be viewed with the appropriate caution.

On the basis of these findings and their interpretation we decided to exclude the group of administrators from the analysis of the relationship between overload and occupational self-esteem. Below, we present a reanalysis of the relationship between overload and occupational self-esteem which excludes administrators.

Reanalysis of the Relationship Between Overload and Occupational Self-esteem

We see from Table 37 that even though the difference of the correlation coefficients becomes larger if we exclude the administrators, it does not reach significance. What does this suggest for the theory? Two lines of thought suggest themselves:

(1) There is no discrepancy between self-attributes corresponding to the overloading performance requirements and the requirements of the situation. But the performance requirements of the situation affect not only the corresponding self-attributes but also more general, content-free,

self-attributes such as "I am a man capable of doing everything that is required of me." It also assumes that this dimension--though not measured--affects our index of occupational self-esteem. With respect to such a general self-attribute there would then exist a discrepancy that is threatening to one's occupational self-esteem. (2) The other way of thinking suggests that each self-attribute has two components, a component of content and a component of degree. It suggests a greater specificity in the determination of self-attributes. According to this thinking a man would not have just a self-attribute of "intelligent critic of the literature," let us say, but a self-attribute that includes a quantitative component; for example, "intelligent critic of all the relevant literature." In the case of quantitative overload there would be no discrepancy with respect to the content component of the self-attribute, but with respect to the quantitative component.

TABLE 37.- Correlation between overload and occupational self-esteem among professors, excluding administrators

	Correlation with occupational self-esteem		
	N	r	p
Quantitative overload	92	-.11	N.S.
Qualitative overload	92	-.26	$< .05$
Significance of the difference	$z = 1.47$		$p > .05$

In our theoretical model we pointed out how existing overload would influence a person in two ways, directly via the perception of the communicated overload and indirectly via the perception of public esteem. When we look at the direct relationship between qualitative overload and occupational self-esteem we see that the correlation is $r = -.26$.

In comparison, the indirect relationship is significantly stronger (see Fig. 7). From this we conclude that qualitative overload affects a professor's occupational self-esteem predominantly because qualitative overload determines a large part of a person's occupational public evaluation. French and Sherwood (1963) assumed that subjective public esteem affects self-esteem. They tested and confirmed this assumption in a field experiment. Self-identity theory states further that a group evaluates a member on the basis of his behavior in relation to group standards. Among professors, qualitative overload means not living up to group standards. Thus we assume that qualitative overload leads to lower subjective public esteem, which in turn leads to lower occupational self-esteem.

In summary, we can say that the hypothesis seems supported that among professors at least qualitative overload has a negative effect on occupational self-esteem, or implies low self-esteem, but that the picture of the relationships suggests future refinements in the conception of the term 'self-attribute.'

Legitimacy as a conditioning variable

We also argued that any relationship that might exist between quantitative overload and occupational self-esteem will be conditioned by the degree of perceived legitimacy of pressure. We find that although there does exist a significant negative relationship between the degree of perceived legitimacy and quantitative overload ($r = -.37 \quad p < .01$), controlling for legitimacy hardly alters the relationship between quantitative overload and occupational self-esteem. The original correlation of quantitative overload and occupational self-esteem was $r = -.11$. When we control for the degree of perceived legitimacy of pressure, the strength of the relationship is reduced to $r = -.07$. This difference is far too small to be significant.

In order to give the reader an overview of what we have done, we now present a summary of the hypotheses and the predictions discussed. After this summary we will go on to the relationship between overload, academic status, and occupational self-esteem.

Summary of Hypotheses and Predictions

Hypothesis 1: There will be an interdependence between qualitative and quantitative overload when more than one dimension is involved. (SUPPORTED)

Prediction: There will be a significant positive correlation between the index of perceived qualitative overload and the index of perceived quantitative overload.

Hypothesis 2a: Qualitative overload affects a professor's public evaluation more negatively than does quantitative overload (SUPPORTED)

Prediction: The correlation between the index of perceived qualitative overload and the index of subjective public esteem will be significantly more negative then the correlation between the index of perceived quantitative overload and the index of subjective public esteem among professors, excluding administrators.

Hypothesis 2b: Quantitative overload is negatively related to the perceived legitimacy of pressure. (SUPPORTED)

Prediction: Among professors, excluding administrators, there will be a significant negative correlation between the index of perceived quantitative overload and the index of perceived legitimacy of pressure.

Hypothesis 2c: The strength of the relationship between quantitative overload and occupational self-esteem will be reduced to the extent that the overload is considered illegitimate. (Not supported)

Prediction: Among professors, excluding administrators, the strength of the relationship--disregarding the direction--between the index of perceived quantitative overload and the index of occupational self-esteem will be significantly reduced when we partial out the effects of the index of perceived legitimacy on that relationship.

Hypothesis 2d: The relationship between quantitative overload and occupational self-esteem will be weaker than the relationship between qualitative overload and occupational self-esteem. (Partly supported)

Prediction: Among professors, excluding administrators, the correlation between the index of perceived qualitative overload and the index of occupational self-esteem will be significantly more negative than the correlation between the index of perceived quantitative overload and the index of occupational self-esteem.

Hypothesis 2e: Qualitative overload will lead to, or imply, low occupational self-esteem. (SUPPORTED)

Prediction: Among professors, excluding administrators, there will be a significant negative correlation between the index of perceived qualitative overload and the index of occupational self-esteem.

Hypothesis 2f: The relationship between qualitative overload and occupational self-esteem is mediated by subjective public esteem. (SUPPORTED)

Prediction: Among professors, excluding administrators, the correlations between the index of perceived qualitative overload and the index of subjective public esteem, and between subjective public esteem and the index of occupational self-esteem, will be significantly greater than the correlation between the index of perceived qualitative overload and the index of occupational self-esteem.

The Relationship Between Overload, Academic Status, and Occupational Self-esteem

In our theoretical discussion we pointed out that status might mean two things to a person: (a) an indication of his objective public evaluation by relevant others, and (b) a communication about a lack of qualitative overload. We present the data first in graphic form. Since overload is one of the variables under consideration, we again exclude administrators from this analysis.

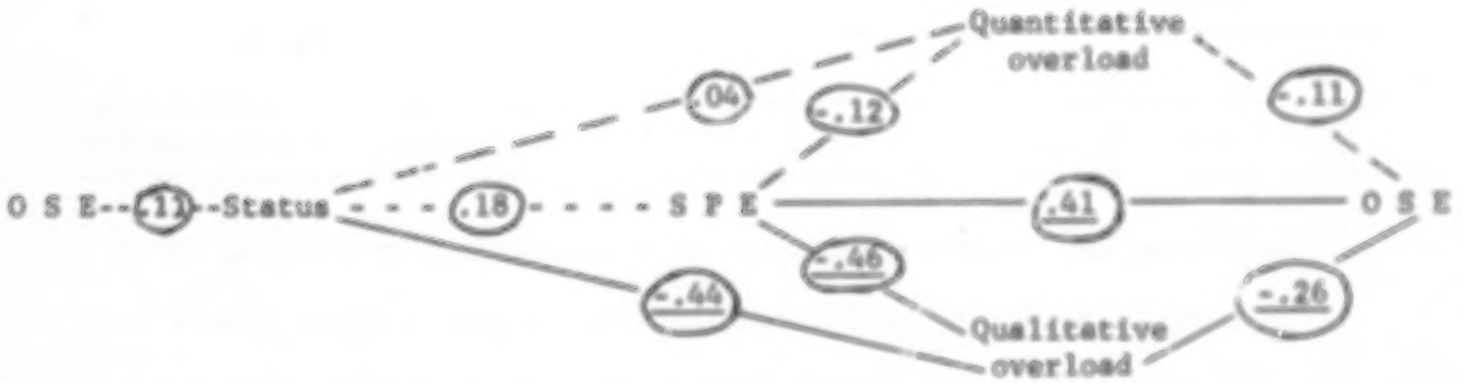
Quantitative overload
.04
-.12
-.11
O S E
.11
Status
.18
S P E
.41
O S E
-.46
-.44
-.26
Qualitative overload

Fig. 9.- Correlogram showing the relations between status, overload, subjective public esteem, and occupational self-esteem among professors, excluding administrators. Correlations significant at the .05 level or better are underlined.

Putting the data not presented previously in the form of a table gives us the following picture:

TABLE 38.- Correlation among status, overload, subjective public esteem, and occupational self-esteem among professors, excluding administrators

38 (a)	Correlation with status		
	N	r	p
Quantitative overload	95	.04	N.S.
Qualitative overload	95	-.44	<.01
Significance of the difference	z = 5.10 p <.01		

38 (b)	Correlation with status		
	N	r	p
Subjective public esteem	92	.18	N.S.
Qualitative overload	95	-.44	<.01
Significance of the difference (disregarding direction)	z = 2.74 p <.01		

TABLE 38--continued

38 (c)	Correlation with status		
	N	r	p
Occupational self-esteem	92	.11	N.S.

We made three predictions with respect to status. We predicted that status would be negatively related to qualitative overload and that this relationship would be significantly stronger than the relationship between quantitative overload and status. Both predictions are confirmed. We further predicted that status would influence subjective public esteem. This was not supported by the data.

Discussion of the Relationship between Status and Perceived Quantitative Overload

It seems curious that there should be no relationship between status and perceived quantitative overload. Is it not reasonable to expect that as a man increases in status, more and more obligations will come his way: committee assignments, involvement in professional societies, national advisory boards, and so forth. Does not the range of activities increase as a man advances in status? Indeed it does. The correlation between status and the range of activities a professor engages in is $r = .43$, which is significant at better than the .01 level.

Thus, considering the increase in range of activities, quantitative overload should be perceived to be greater as a man increases in status. On the other hand, however, a person is likely to adjust to this state of affairs to the end that his subjective feeling of being torn in different directions may not increase proportionately. A young assistant professor may experience the same feeling of quantitative overload in spite of an objectively smaller degree of overload. Can we substantiate the hypothesis that the same degree of quantitative overload is experienced differently by men of differing status? We have no direct evidence, but perhaps the following argument will suffice. In the interview we found that 62% of the full professors gave as one of their work motivations the plain enjoyment of activity. Only 37% of the assistant professors reported "Funktionslust" as a work motivation. This difference is significant at the .05 level, and it was interpreted as indicating the effect of prolonged socialization which makes it difficult to specify just why one works and for what ends.

Furthermore, when asked about the rewards of the job, 62% of the associate professors mentioned working conditions while only 30% of the assistant professors did. This difference is significant at the .05 level. Under the heading "working conditions" we coded all expressions of satisfaction with external aspects of the work situation, such as little politics, the support given to one's work by the university, or tolerant superiors. The relatively smaller satisfaction derived from this work aspect might again be interpreted as relatively less adjustment to the job.

Thus we conclude that while a multitude of demands increases, the adjustment to the job also increases. Both forces seem to cancel each other out so that in the end there is no relationship between status and quantitative overload.

We should in this connection also consider the following argument: It is perhaps correct to assume that men of higher rank will get involved in a greater number of professional obligations. On the other hand there is the factor of age: it is the young men who will be most willing to carry the heaviest work load. As a person increases in age, he will try to reduce his work load or overload. Since age and status are correlated ($r = .71$, $p < .01$), these two factors will pull in opposite directions. If this argument is correct, then we would expect that the younger men at each status level experience the greatest quantitative overload. The data are presented in Table 39.

Prediction: Within each status level there will be a significant negative correlation between age and quantitative overload.

TABLE 39.- Correlation of age and quantitative overload in the various status groups

	Correlation of age and quantitative overload		
	N	r	p
Among Assistant Professors	45	.11	N.S.
Among Associate Professors	21	.08	N.S.
Among Full Professors	29	-.03	N.S.

We see that this prediction is not confirmed. This means that we cannot attribute the lack of relationship between status and quantitative overload to any opposing effect of age on quantitative overload.

Discussion of the Relationship between Status and Subjective Public Esteem

The relationship between status and subjective public esteem is not significant, although self-identity theory is very explicit about the connection between objective public esteem and subjective public esteem. The relationship found is curious because it is insignificant.

We feel that the best explanation for this lack of relationship lies in the fact that academic rank is not the best fitting operationalization of objective public evaluation. More than one writer points out that in the academic world the institution which confers the status, and the reference group determining the esteem are not the same. Barzun (1945) points out that a professor "is hired for one purpose, expected to carry out another, and prized for achieving a third: teaching, research, prestige are independent variables." Or Cooley (1931) states that "institutions and genius are in the nature of things antithetical, and if a man of genius is found living contentedly in a university, it is peculiarly creditable to both." Finally, Wilson (1942) says "paradoxical as it may seem, professional recognition is achieved through activities engaging a minor portion of the average man's activities." Of course, it is the belief of every organization that it awards status on the basis of prestige, but Caplow and McGee (1958) point out how this belief may be too simple a faith.

Another argument to explain the lack of correlation between status and subjective public esteem is to say that while the value scales remain the same at all status levels, the value standards change. Creativity may be a value scale applicable to all ranks but an assistant professor may be judged creative simply on the basis of a brilliant thesis. To a certain extent we take a man's rank into consideration when we evaluate him. Since value standards are set by the group it might also be argued that the relatively low correlation between status and subjective public esteem is due to the fact that a man's reference group changes as he increases in status.

Status Perceived as Control Over the Job

We find that within the academic ranks--excluding administrators--status and perception of self as a source of pressure are positively correlated. The correlation is r = .28, which is significant at better than the .01 level. This significant relationship helps us in our understanding of the relationship of status and qualitative overload. We interpret the relation between status and self as pressure to mean that the objective variable 'status' is subjectively perceived by the person--in part at least--as having control over the job. But according to the dynamics of self-esteem discussed in the theoretical chapter, having control over the job should result in a reduction of the self-esteem threatening qualitative overload.

This is indeed the case. The correlation between the self as a source of pressure and perceived qualitative overload is r = -.29 (p <.01).

Summary of Hypotheses and Predictions

Hypothesis 3a: Status influences the perception of qualitative overload in that as status increases the perception of qualitative overload will decrease. (SUPPORTED)

Prediction: Among professors, excluding administrators, there will be a significant negative correlation between status and the index of perceived qualitative overload.

Hypothesis 3b: The relationship between perceived qualitative overload and status will be stronger than the relationship between status and perceived quantitative overload. (SUPPORTED)

Prediction: Among professors, excluding administrators, the correlation between status and the index of perceived qualitative overload will be significantly more negative than the correlation between status and the index of quantitative overload.

Hypothesis 3c: As status increases subjective public esteem will also increase. (Not supported)

Prediction: Among professors, excluding administrators, there will be a significant positive correlation between status and the index of subjective public esteem.

The Relationship Between Overload and the Number of Work Hours

We hypothesized that perceived quantitative overload would lead to an increase in the number of hours the professor spends on his professional activities. We also hypothesized that the relationship would be significantly weaker between qualitative overload and the number of work hours reported. Since we asked both the professor and his wife for an estimate of work hours, we present the data from both groups (Table 40). We exclude from this analysis again the group of administrators for the reasons given earlier, and also because in this group of administrators the definition of what is meant by "work" does not seem to be a uniform one.

TABLE 40.- Correlation between overload and work hour estimates, as reported by the professors and by their wives.

	Correlation with hours rep. by man			Correlation with hours rep. by wife			Significance of difference	
	N	r	p	N	r	p	z	p
Quant. Overload	86	.25	<.05	85	.03	N.S.	2.12	<.05
Qual. Overload	86	-.09	N.S.	85	-.20	N.S.	1.01	N.S.
Significance of difference	z = 3.24 p <.01			z = 2.10 p <.05				

We see that our hypotheses are confirmed for the husband's estimate of his work hours. They are only weakly supported for the wife's estimate of her husband's work hours. It is difficult to say which estimate gives the more correct picture of the actual state of affairs. We do not feel that we can decide this question in the present study.

We would like to point out, however, that the relationship of overload and work hours is influenced by a third variable, the degree of perceived legitimacy of the pressure.

Quantitative overload was defined as the degree to which one's own preferred time distribution differs from the time distribution imposed by the demands of the job being too numerous in certain areas. Do professors accept this state of affairs as legitimate or do they see it as an illegitimate imposition?

TABLE 41.- Correlation between overload and perceived legitimacy of pressure

	Correlation with perceived legitimacy		
	N	r	p
Quantitative Overload	94	-.37	<.01
Qualitative Overload	94	-.13	N.S.
Significance of the difference	z = 2.51 p <.01		

We find in the above table a strong indication that quantitative overload is seen as an illegitimate imposition in contrast to qualitative overload, where this association is significantly weaker. Next we can ask whether the degree of perceived legitimacy is also related to the estimates of work hours. Table 42, shows that while legitimacy is negatively related to the professor's estimate of his work hours, the relationship is not significantly different from that between the wife's estimate and legitimacy.

TABLE 42.- Correlation between the work hour estimates of the professors and their wives with the degree of perceived legitimacy of pressure

	Correlation with perceived legitimacy		
	N	r	p
Work hour estimate reported by the professor	86	-.23	<.05
Work hour estimate reported by the wife of the professor	85	-.09	N.S.
Significance of the difference	z = 1.32 p >.05		

If we control the relationship between perceived quantitative overload and the professor's work hour estimate by partialling out the effects of perceived legitimacy on that relationship, the correlation of r = .25 loses significance. It becomes r = .18 (p >.05). If we control for the degree of perceived legitimacy, the correlation between quantitative overload and wife's estimate of work hours changes from r = .03 (p >.05) to r = -.01 (p >.05).

If we control the relationship between perceived qualitative overload and the professor's work hour estimate by partialling out the effects of perceived legitimacy on that relationship, the relationship remains virtually the same. The correlation coefficient of r = -.09 becomes r = -.12. The relationship between qualitative overload and the wife's estimate of the husband's work hours also remains virtually unchanged when we control for the effects of perceived legitimacy. The correlation coefficient of r = -.20 becomes r = -.21.

Before we present the data in the form of a correlogram we would like to ask ourselves another question: Is the relationship between quantitative overload and the professor's work hour estimates affected by the man's achievement orientation? When we control the correlation between quantitative overload and the man's work estimate for achievement orientation, the correlation of r = .25 reduces to r = .17--which again is not significant. The difference between the correlations is not great, but as a suggestion it might be justified to state that working more is used as a technique of coping with quantitative overload only by men with high achievement orientation. Controlling the other three relationships between overload and work hour estimates of either the professor or his wife for the effects of achievement orientation does not alter the relationships in any way worth talking about.

Fig. 10

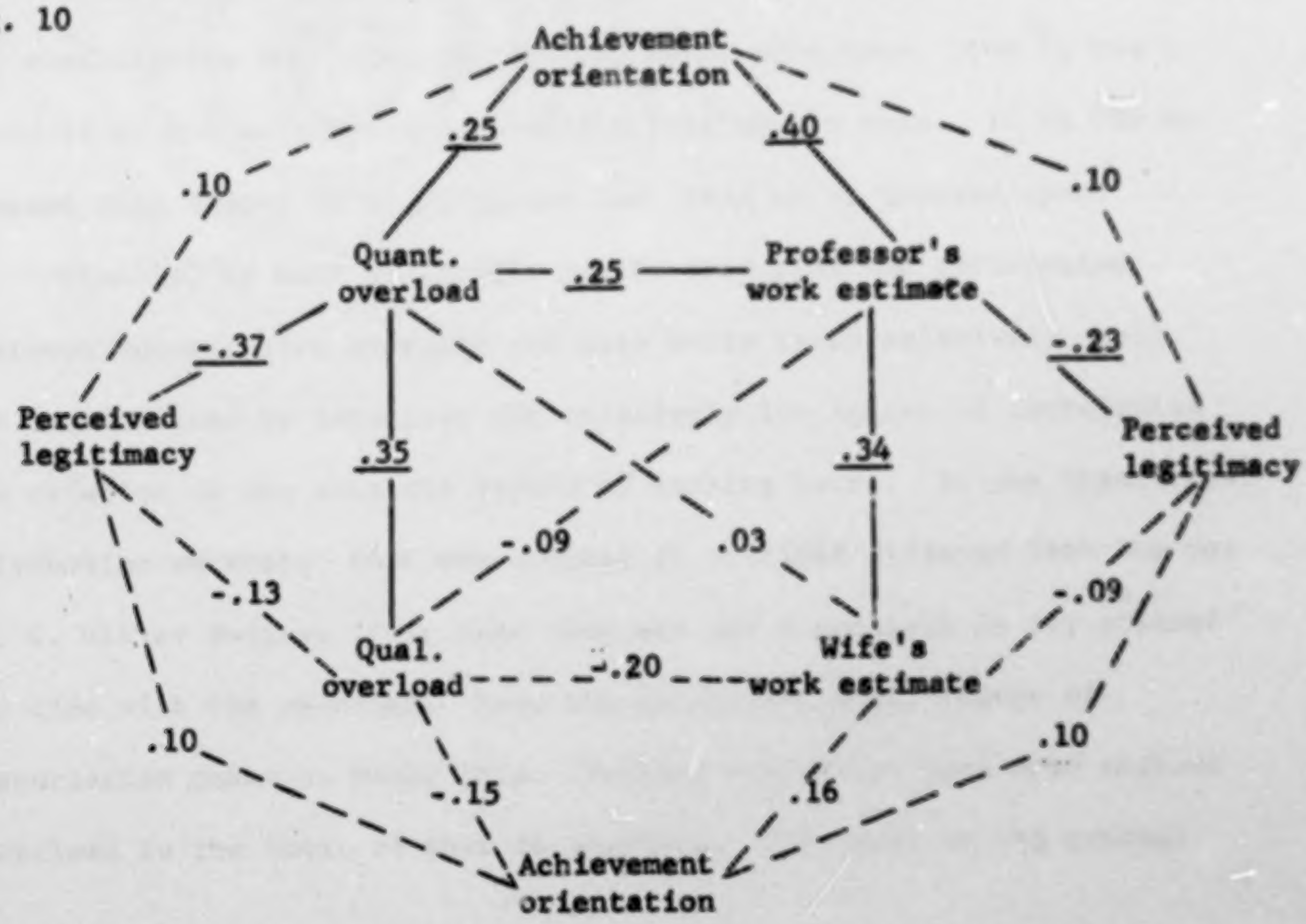
Achievement orientation
.10
.25
.40
.10
Quant. overload
.25
Professor's work estimate
-.37
-.23
Perceived legitimacy
.35
.34
Perceived legitimacy
-.09
.03
-.13
-.09
Qual. overload
-.20
Wife's work estimate
.10
.10
-.15
.16
Achievement orientation

Fig. 10.- Correlogram of the relationships among overload, legitimacy of pressure, and work hour estimates of the professor and his wife--excluding administrators. Correlations significant at the .05 level or better are underlined.

We infer from this correlogram that the variable 'perceived legitimacy of pressure' has some conditioning effect on the relationship between quantitative overload and the professor's estimate of his work hours. It seems as if the feeling of frustration which is likely to accompany illegitimate demands has effects not only on the feeling of being overloaded, but it also seems to make more of what the professor does appear to be work. The data from the wife suggest that in actuality the professor who feels overloaded may not really work longer hours, but that whatever he does just seems to be more of a burden to him.

Of course, another interpretation also may be valid. Conditions of quantitative overload make the professor work more. But he has a norm as to how many hours represent a fair week's work. If he has to exceed this number of hours he may feel that he is imposed upon.

Finally, we want to comment on the fact that the correlation between quantitative overload and work hours is so relatively small. We are inclined to interpret the relatively low degree of correlation in relation to the absolute levels of working hours. In the theoretical discussion we stated that our concept of overload differed from the way J. G. Miller defines it in that time was not a constant in any attempt to cope with the overload. Now, the relatively small degree of association makes us doubt this. Perhaps professors work even without overload to the limit of what is possible. They work on the average

57 hours a week. There are few groups that work more. If they work long hours as a matter of course, then this approaches the kind of situation Miller deals with where time is no longer a viable mechanism of coping with overload, thus making the small degree of association between quantitative overload and work hours understandable.

Summary of Hypotheses and Predictions

Hypothesis 4a: As quantitative overload increases, the number of work hours will also increase. (Partly supported)

Prediction: Among professors, excluding administrators, there will be a significant positive correlation between the index of perceived quantitative overload and the professor's estimate of his weekly work hours.

Prediction: Among professors, excluding administrators, there will be a significant positive correlation between the index of perceived quantitative overload and the wife's estimate of her husband's weekly work hours.

Hypothesis 4b: The relationship between qualitative overload and the number of work hours will be significantly different from the relationship between quantitative overload and the number of work hours. The relationship will be less strongly positive or even negative. (SUPPORTED)

Prediction: Among professors, excluding administrators, the correlation between the index of perceived qualitative overload and the work hour estimate of the professor will be significantly different from the correlation between the index of perceived quantitative overload and the work hour estimate of the professor.

Prediction: Among professors, excluding administrators, the correlation between the index of perceived qualitative overload and the work hour estimate made by the wife will be significantly different from the correlation between the index of perceived quantitative overload and the work hour estimate made by the wife.

The Relationship Between Overload and Achievement Orientation

For the relationship between achievement orientation and overload, we hypothesized that the greater the achievement orientation, the greater will be the quantitative overload. We also hypothesized that this relationship would be significantly more positive than the relationship between achievement orientation and qualitative overload.

Before we enter into a presentation and discussion of the data we want to show again why we decided to exclude the administrators in our sample from this analysis. We found that the relationship between quantitative overload and achievement orientation was different for the two groups (Table 43).

TABLE 43.- Correlation between quantitative overload and achievement orientation among professors and among adminis among administrators

	Correlation of achievement orientation and quant. overload		
	N	r	P
Among all members of the sample	87	.17	N.S.
Among professors excluding administrators (a)	78	.25	<.05
Among administrators (b)	9	-.37	N.S.
Significance of the difference between groups (a) and (b)	z = 1.53 p <.10		

How can we explain this difference in relationship? We formulated our hypothesis about the positive association between quantitative overload and achievement orientation by using the following rationale:

Achievement orientation means striving for public esteem. This will lead to the taking on of duties that are seen as instrumental toward this goal. But what if the number of duties is relatively fixed at an overloading level and public esteem is given on the basis of reducing this existing overload? In this case the prediction would go in the opposite direction. In other words, only if the person himself determines the nature of his duties will we find a positive correlation between achievement orientation and quantitative overload. But at this point we find differences in our sample. The score for the degree to which the self is a source of pressure is 64.4 for the academic ranks excluding administrators. The same score for the administrators is 45.3. This difference is not significant but it shows a trend. Since our sample of administrators is so small it is difficult to obtain significant results. It should also be pointed out that one of the subscales of achievement orientation--emphasis on research--is less applicable to administrators, although the difference of the means is again not significant.

Finally, there is one more deduction that should be made. If achievement orientation means striving for public esteem, and public esteem influences self-esteem, and if furthermore the relationship between quantitative overload and achievement orientation is different for professors and administrators, then the relationship between quantitative overload and occupational self-esteem should also be different in the two groups. This is indeed the case. The relationship between quantitative overload and occupational self-esteem was significantly stronger among administrators, as we saw earlier.

In summary, we can say that our assumption that overload has a different meaning for professors than for administrators seems sufficiently supported to exclude administrators from this analysis. Thus, our prediction reads:

> Prediction: Among professors--excluding administrators--there will be a significant positive correlation between our index of achievement orientation and the index of perceived quantitative overload.

With respect to the relationship between achievement orientation and qualitative overload we hypothesized that it should be different from the relationship between quantitative overload and achievement orientation. We came to this conclusion because, since qualitative overload is clearly negatively related to public esteem, we assumed that a person of high achievement orientation would try to avoid creating qualitative overload for himself. If this assumption is correct, then we should find a negative correlation between the self as a source of pressure and qualitative overload. This is the case. The correlation is $r = -.29$, which is significant at the .01 level. We thus predict the following:

> Prediction: The correlation between the index of achievement orientation and the index of perceived quantitative overload will be significantly more positive than the correlation between the index of achievement orientation and the index of perceived qualitative overload among professors--excluding administrators.

TABLE 44: Correlation between overload and achievement orientation among professors, excluding administrators

	Correlation with achievement orientation		
	N	r	p
Quantitative overload	78	.25	$< .05$
Qualitative overload	78	-.15	N.S.
Significance of the difference	$z = 3.68$		$p < .01$

We see from Table 44, above, that both predictions in support of the corresponding hypotheses are confirmed. But what do the data indicate when we consider each subscale separately? Table 45 presents the correlations between overload and the seven subscales.

TABLE 45.- Correlation between overload and the seven subscales of the achievement orientation index among professors, excluding administrators

Subscale	N	Correlation with quantit. overload		Correlation with qualit. overload		Significance of the difference	
		r	p	r	p	z	p
Achievement Self-Conf.	78	.03	N.S.	-.30	< .05	3.02	< .01
Drive	78	.22	N.S.	-.02	N.S.	2.27	< .05
Leadership	78	.24	< .05	-.17	N.S.	3.80	< .01
Range of Activities	78	.22	N.S.	-.35	< .01	5.52	< .01
Pushing of Self	78	.39	< .01	.12	N.S.	2.57	= .01
Emphasis on Research	78	.04	N.S.	-.01	N.S.	0.45	N.S.
Att. towards Pressure	78	-.02	N.S.	.16	N.S.	1.61	N.S.

We hypothesized that high achievement orientation in the strictly academic ranks would show itself in the tendency to take on more duties than the man can handle comfortably. Those of the subscales which seem best suited to assess this tendency are leadership, range of activities, pushing of self, and drive. One might wonder whether 'leadership' belongs into this group, but we feel that in the academic setting with its limited possibilities for delegation of work among colleagues, the assumption of leadership functions will involve an increased amount of work for the leader himself. Two of the four scales assumed to assess the inclination to take on more work relate significantly to quantitative overload. The other two scales approach significance and would be significant if we used a one-tail test. Moreover, one might say that increasing one's range of activities will not be an automatic way of increasing achievement. Spreading oneself too thin might be actually detrimental to achievement. We proceeded on the assumption that increasing one's range of activities represented an increase of one's particular domain more than would a branching out into unconnected areas of work. Since the correlation between range of activities and 'achievement/self-confidence'--our best measure of actual achievement--is $r = .45$ ($p < .01$), this seems a justified assumption. But since the correlation is not greater, our assessment of range of activities might well contain some of the tendency to spread oneself thin.

We did not make any strong predictions about the relationship between achievement orientation and qualitative overload. However, the significant relationships we do find seem plausible. It seems reasonable to assume that a person whose low achievement orientation expresses itself in a narrow range of activities will preceive himself as not living up to the norms of the job. Another interpretation of the same relationship would be that a person who feels that he is not up to the demands of the job will restrict his range of activities in order to avoid failure. It will probably be best to assume an interdependent relationship. The relationship between 'achievement/self-confidence' and perceived qualitative overload is to be expected since both do in part, at least, measure the same thing.

We would like to add at this point a short discussion of the relationships among the variables 'self as a source of pressure,' 'qualitative overload,' and 'perceived legitimacy of pressure,' as represented in Fig. 11.

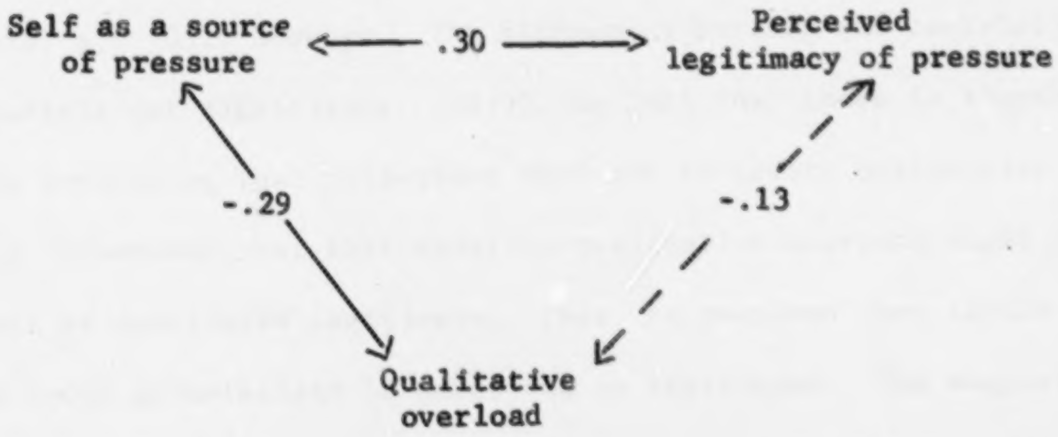
Self as a source of pressure
.30
Perceived legitimacy of pressure
-.29
-.13
Qualitative overload

Fig. 11: Correlogram showing the relationships between qualitative overload, perceived legitimacy of pressure, and self as a source of pressure among professors, excluding administrators. Straight lines indicate significant relationships. Broken lines indicate that the relationship is not significant.

Among professors--excluding administrators--we find a positive relationship between the self as a source of pressure and the perceived legitimacy of the pressure. We assume that legitimacy means that the pressure is accepted by the self. It is reasonable to assume, also, that pressure which the self creates is accepted by the self. A further explanation of the positive relationship between the self as a source of pressure and the perceived legitimacy would be that pressures that are seen as legitimate and justified are more acceptable to the self. We assume that it is easier for the self to internalize a legitimate pressure than an illegitimate one. The correlation between the self as a source of pressure and the degree of perceived legitimacy of pressure is $r = .30$, which is significant at better than the .01 level. On the other hand, the correlation between the self as a source of pressure and qualitative overload is negative ($r = -.29$, $p < .01$). Thus, we might logically expect a negative relationship between perceived legitimacy and qualitative overload. There is no such relationship ($r = -.13$, $p > .05$), however. The difference between the correlations is unfortunately not significant. Still, we feel that there is suggestive evidence indicating that professors tend not to create qualitative overload for themselves, but that existing qualitative overload might or might not be considered legitimate. Thus, an overload that is not self-induced could nevertheless be perceived as legitimate. The suggestion that qualitative overload is perceived as coming from without adds further support to the hypothesis, discussed earlier, that qualitative overload affects occupational self-esteem via the resulting public esteem.

Summary of Hypotheses and predictions

Hypothesis 5a: The greater the achievement orientation, the greater will be the quantitative overload. (SUPPORTED)

Prediction: Among professors--excluding administrators--there will be a significant positive correlation between the index of achievement orientation and the index of perceived quantitative overload.

Hypothesis 5b: The relationship between achievement orientation and qualitative overload will be significantly more in negative direction than the relationship between achievement orientation and quantitative overload. (SUPPORTED)

Prediction: The correlation between the index of achievement orientation and the index of perceived quantitative overload will be significantly more positive than the correlation between the index of achievement orientation and the index of qualitative overload among professors--excluding administrators.

- - - - - - -

This concludes the discussion of the relationship among the psychological variables. We turn now to a discussion of those relationships that involve both physiological and psychological variables.

CHAPTER VI

RESULTS: FINDINGS CONCERNED WITH THE RELATIONSHIPS AMONG PSYCHOLOGICAL AND PHYSIOLOGICAL VARIABLES

Up to now our discussion has remained within the same level of abstraction, namely the psychological level. Even the effects of status were explained by reference to their psychological meaning. As long as we remained within the same level of abstraction, it was appropriate to make causal statements at least in our theoretical discussion. Whether it is permissible to make causal statements that cut across levels of abstraction is a much more disputed question. Moreover, in dealing with physiological variables we are dealing with variables where many of the links in the causal chain among the physiological events are still obscured. This is another reason that makes it advisable to talk of associations or relationships only and to avoid all statements of causality. For these reasons we decided to separate the discussion of the relationships between variables of different levels of abstraction, and to subsume them under a separate chapter.

The Relationship between Overload and Cholesterol

We hypothesized on the basis of previous findings in the literature that quantitative as well as qualitative overload should be related to serum cholesterol levels. Our correlational analysis gives us the following data (again, excluding the administrators):

TABLE 46.- Correlation between cholesterol and overload

	Correlation with cholesterol		
	N	r	p
Quantitative overload	91	+.15	N.S.
Qualitative overload	91	+.03	N.S.
Significance of the difference	$z = 1.13 \quad p > 0.05$		

We see that none of the three hypotheses is supported in this sample. We want to point out that we stated these hypotheses only tentatively, since we are not measuring overload in a temporary and specific stress situation, but as a chronic condition. In the literature, the established relations are for the most part between a temporaray stress situation and cholesterol.

We pointed out in our discussion of cholesterol that it is related to age. Qualitative overload is also related to age ($r = -.36$, $p < .01$). Could age be a conditioning variable? If we control for the effects of age, the correlation between qualitative overload and cholesterol becomes $r = .09$, which is not significant. The difference in the correlations is also not significant. Thus we are left with the conclusion that overload and cholesterol do not seem to be related in our sample.

Summary of Hypotheses and Predictions

Hypothesis 6a: The higher the quantiative overload the higher the serum cholesterol level. (Not supported)

Prediction: Among professors, excluding administrators, there will be a positive correlation between the index of quantitative overload and the measure of serum cholesterol.

Hypothesis 6b: The higher the qualitative overload the higher will be the serum cholesterol level. (Not supported)

Prediction: Among professors, excluding administrators, there will be a positive correlation between the index of perceived qualitative overload and the measure of serum cholesterol.

Hypothesis 6c: Qualitative overload and serum cholesterol levels will be related more strongly than quantitative overload and serum cholesterol levels. (Not supported)

Prediction: Among professors, excluding administrators, the correlation between the index of qualitative overload and the measure of serum cholesterol will be significantly more positive than the correlation between the index of quantitative overload and the measure of serum cholesterol.

The Relationship between Achievement Orientation and Serum Uric Acid

We turn next to a consideration of the relationship between achievement orientation and serum uric acid. We hypothesized that as serum uric acid levels increased, achievement orientation would also increase. We translated our hypothesis into the following prediction: There will be a significant positive correlation between serum uric acid values and the index of achievement orientation. The data are presented in Table 47.

TABLE 47.- Correlation between serum uric acid, achievement orientation index, and the seven subscales of this index

	Correlation with serum uric acid		
	N	r	p
A O B Score	87	.61	< .01
Achievement and Self-confidence	87	.52	< .01
Drive	87	.50	< .01
Leadership	87	.49	< .01
Range of Activities	87	.41	< .01
Pushing of Self	87	.39	< .01
Emphasis on Research	87	.19	N.S.
Attitude toward Pressure	87	.18	N.S.

We see that the AOR score and five of the seven subscales are significantly related to the level of uric acid in the serum. The subscales, "Achievement and Self-confidence," "Drive," and "Leadership," correlate highest with serum uric acid. However, until this measure of achievement orientation is cross-validated, we cannot say that the same three subscales will again emerge as the highest.

The relationships between achievement orientation and serum uric acid within the four status groups are presented in Appendix S. The relationships are, with a few exceptions, essentially the same within the status groups. Where there are differences we cannot say whether or not these are reliable or due to the reduction in size of the sample. That fewer correlation coefficients reach the set level of significance ($p < .05$) seems to be related to the smaller number of cases in each status group. For these reasons we prefer not to speculate about the possible meaning of differences among status groups.

Summary of Hypothesis and Prediction

Hypothesis 7: As serum uric acid levels increase, achievement orientation will also increase. (SUPPORTED)

Prediction: There will be a significant positive correlation between the measures of serum uric acid and the scores on the index of achievement orientation.

The Relationship between Achievement Orientation and Cholesterol

We hypothesized, mainly on the basis of the work by Friedman and Rosenmann (1958), that serum cholesterol levels should be related to high levels of achievement orientation. Our prediction was, "There will be a positive significant correlation between the scores on the index of achievement orientation and the measures of serum cholesterol levels."

We see from Table 48, below, that the hypothesis is not supported. Neither the AOR score nor any of its subscales are significantly related to the level of cholesterol. Because of the sizeable number of cases studied, the chance that a relationship like the one suggested by Freidman and Rosenman (1958) could be present but undetected in these data is negligible and does not need to be considered.

TABLE 48.- Correlation between cholesterol, achievement orientation index, and the seven subscales of this index

	Correlation with cholesterol		
	N	r	p
A O R Score	87	.03	N.S.
Achievement and Self-confidence	87	.11	N.S.
Drive	87	-.01	N.S.
Leadership	87	.14	N.S.
Range of Activities	87	.14	N.S.
Pushing of Self	87	-.08	N.S.
Emphasis on Research	87	-.08	N.S.
Attitude toward Pressure	87	-.10	N.S

Discussion of the Differential Relationship of Serum Uric Acid and Cholesterol with Achievement Orientation

The lack of positive association shown above is an unexpected finding and needs further consideration, especially since the differences become even more striking when we control the relationship between cholesterol and achievement orientation for the effects of serum uric acid levels on that relationship. The correlation between serum uric acid and cholesterol is r = .22, which is significant at the .05 level.

The differences in the relationships between serum uric acid and achievement oriented behavior, and cholesterol and achievement oriented behavior, are significant in all eight instances (Table 49). Thus, as a group, men with high cholesterol levels show average achievement oriented behavior in all its aspects measured here, which is less than what we find in men with high levels of serum uric acid.

TABLE 49.- Differences in the correlations between the achievement orientation index, its subscales, and serum uric acid and cholesterol, respectively

	Serum Uric Acid "corrected r"	Cholesterol "corrected r"	Significance of the difference
AOB Score	.62	-.10	z = 5.58, $p < .001$
Ach./Self-conf.	.52	-.01	z = 3.81, $p < .001$
Drive	.52	-.14	z = 4.69, $p < .001$
Leadership	.47	-.04	z = 3.04, $p < .01$
Range of Activ.	.39	.06	z = 2.28, $p < .05$
Pushing of Self	.42	-.18	z = 4.09, $p < .001$
Emph. on Research	.21	-.13	z = 2.18, $p < .05$
Att. toward Pressure	.20	-.15	z = 2.27, $p < .05$

"Corrected r" means the correlations between the variables after controlling for the correlation between cholesterol and serum uric acid (r = .22, $p < .05$).

How can we explain this lack of relationship between cholesterol and achievement orientation? At the conceptual level, "persistent desire for recognition" comes close to what we call 'status striving.' "Habitual propensity to accelerate their pace of living and working" sounds like our concept of 'drive.' But we do not have a concept that seems to correspond to what Friedman and Rosenman call "excessive competitive drive." On the other hand, their behavior pattern does not seem to include such aspects as tendency to leadership, range of activities, or achievement and self-confidence. Thus, we see that even at the conceptual level the two patterns are not as similar as they might appear. Moreover, when it comes to the operationalization of the various aspects of the concept, the two studies seem quite different, although we can't say how much different since we don't know on the basis of what cues the judges rated a person as exhibiting behavior pattern A.

But if we conclude that "Behavior Pattern A" and "Achdievement Orientation" are different concepts, then this raises the question as to what is the difference between the two. We cannot make a direct comparison between our group of university professors and the samples used in other studies; we don't have the data. But we can look within our group of professors at the context of serum uric acid and cholesterol, respectively. From such a comparison we may be able to draw inferences which yield useful hypotheses for future research.

In which direction shall we search? The study by Friedman et al. (1959) on the relation of cholesterol to cyclical stress was done among owners or responsible partners of accounting firms. Thus, it might be assumed that in this group, striving carried with it an element of worry and anxiety. Kissin et al. (1959) describe the men inclined to coronary disease as ceaseless striving without joy. On the basis of these leads we hypothesize that the striving of men with high cholesterol levels will best be distinguished from the achievement oriented behavior of men with high levels of serum uric acid by the presence or absence of worry and anxiety.

This study does not contain any measures of anxiety. We did, however, ask the wife to indicate how much the husband worries about a number of job and life aspects. The average of these ratings yielded a "worry index" described in more detail in Appendix T. How does this worry index relate to serum uric acid and cholesterol, respectively? If our hypothesis is correct, then the relationship of serum uric acid and the worry index should differ significantly from the relationship of cholesterol and the worry index. The data are presented in Table 50.

TABLE 50.- Differences in the correlations of serum uric acid and cholesterol with the worry index (wife reporting)

	Correlation with "worry index"		
	N	r	p
Serum uric acid	87	-.24	< .05
Cholesterol	87	.00	N.S.
Significance of the difference	z = 2.09		p < .05

Unfortunately, these data lend only weak support to our hypothesis. It is true that the relationship between serum uric acid and worrying is significantly different from the relationship between cholesterol and worrying. However, we cannot say that men with high cholesterol levels worry a great deal--which is what our hypothesis implied. We can only say that men with high serum uric acid levels worry significantly less than men with high cholesterol levels. The lack of correlation between worrying and cholesterol is in line with factor-analytic data presented by

Cattell and Scheier (1961) who also failed to find an association between anxiety--as measured by their scale U.I. 24--and their cholesterol/pulse rate factor. On the basis of a second-order factor analysis, Cattell and Scheier (1961) conclude that increase in serum cholesterol level might be a distinct way of reacting to frustration.

What groups of people are likely to be frustrated and might thus be expected to react to frustration with raised cholesterol levels? We will assume that those who perceive the pressure they are under as illegitimate, and those who do not feel that they themselves are the source of pressure, will be more likely to be frustrated. The data available show a trend in this direction. The correlation between cholesterol and the degree of perceived legitimacy is $r = -.10$ ($p > .05$). The correlation between cholesterol and self as a source of pressure is also negative ($r = .08$, $p > .05$). In both cases the relationship with serum uric acid is in the opposite--i.e., positive--direction. The correlation between serum uric acid and the degree of perceived legitimacy is $r = .09$ ($p > .05$). The correlation between serum uric acid and self as a source of pressure is $r = .05$ ($p > .05$).

Inconclusive as these data are, they do point out a trend that seems worthwhile pursuing. We suggest the following hypothesis for future research with a larger sample and with more cogent questions: Men who strive happily and with a sense of enjoyment and satisfaction will be those with high serum uric acid levels; men whose striving is a response to frustration will be those who show elevated levels of serum cholesterol. We believe that 'driving' versus 'being driven' will appear as the variable that separates men with high levels of serum uric acid from those with high levels of serum cholesterol.

Summary of Hypotheses and Predictions

Hypothesis 8: As achievement orientation increases, serum cholesterol levels will also increase. (Not supported)

> Prediction (a): There will be a significant positive correlation between the index of achievement orientation and the measurement of serum cholesterol level.

• • • • • • • • • • •

This concludes the presentation and discussion of the data. In the next chapter we try to summarize the findings, draw conclusions, and point at areas for future research.

CHAPTER VII

SUMMARY, CONCLUSIONS, AND SUGGESTIONS

Summary

This study is the attempt to present a matrix of relationships surrounding two kinds of work pressure: (a) quantitative overload, defined as the pressure arising from the fact that a person's preferred time distribution is discrepant from the required time distribution due to the quantity of demands in certain areas of the job, and (b) qualitative overload, the discrepancy between a presently held skill level and the skill level required by the job.

Secondly, this study relates a characteristic of the person, achievement orientation, to serum uric acid, an end-product of human metabolism.

Lastly, a hypothesis is developed to differentiate the achievement orientation found in men with high levels of serum uric acid from the kind of striving we see in men with high levels of serum cholesterol.

Chapter II outlines relevant concepts of self-identity theory as developed by D. R. Miller (1963) and French and Sherwood (1963) which provide the theoretical background for the discussion of the concepts of quantitative and qualitative overload. It also gives the rationale for eight major hypotheses that link overload to status, to characteristics of the person, and to emotional, behavioral, and physiological reactions.

Chapter III describes in detail the methods of this study. The data come basically from two sources, the self-report of the individual, and an extensive physical examination. The measurements of the variables are discussed. A newly developed measure of achievement orientation that should be of continuing usefulness for future research was described in great detail.

Chapter IV gives a feeling for the kind of men studied in our sample. It describes professors as hard working, satisfied with their jobs, and motivated by intrinsic rather than extrinsic considerations. The greatest rewards of being a professor seem to lie in the relative freedom and independence offered by the job as well as in the opportunity it affords for utilizing one's skills and talents to a high degree.

Chapter V presents the results of a correlational analysis of the data. It converts the theoretical, causally stated hypotheses, into empirical predictions. It tests these predictions by looking at the significance levels of the obtained correlations and by testing the significance of the difference between correlations. An added feature of this analysis frequently not found in other studies is the fact that all relationships are controlled for defensiveness to the extent possible by use of the K-scale as a correction measure.

The analysis supports the hypothesis that quantitative overload and qualitative overload are interdependent, but different from each other in their relationship to status, subjective public esteem, and achievement orientation. Partial support is given to the hypothesis that quantitative and qualitative overload relate differentially to occupational self-esteem, and to the number of hours a professor works. The hypothesis that overload will be related to cholesterol is not supported in this study. The analysis described one of the differences that prevailed within our sample, between professors and academic administrators such as chairmen or deans. The difference seems to lie in the fact that professors as compared to administrators are decidedly less negatively affected in their self-esteem by quantitative overload. Finally, the analysis presents substantial support for the association between serum uric acid and a kind of achievement orientation that strives for public esteem.

Conclusions

The first conclusion which seems to arise from the present study is that professors at a major university belong to a highly privileged group. According to medical evidence, they are above average in health. Economically, they are in a position where concerns about money have moved from concerns about necessities to concerns for amenities. Professors have no complaints about social status: they feel that they have prestige, are appreciated, and to some extent there is even a feeling of power. Psychologically, this group combines freedom and independence in their work with a fair degree of security and extrinsic reward. The anxieties described in such studies as Caplow and McGee's The Academic Market Place (1958) are present but seem predominantly a creation of the person's own aspirations. "Publish or perish" is an issue, but the opportunities to do research and the support for it seem to make it less of a dilemma than might appear from other studies and from the general folklore. The shadow in the picture seems to come from the fact that the professor's family pays to a certain extent for his dedication, and from the fact that a group which seems exemplarly equipped to make use of leisure does not have it.

A second conclusion which we feel emerges from the study is the need for more specificity in the use of such concepts as 'stress' or 'pressure.' As we saw, even a relatively specific concept such as work pressure due to discrepancies between self-attributes and performance requirement needs to be broken down further in order to yield meaningful relationships.

Finally, there is a tentative conclusion which we have stated as a hypothesis for further research: It is not just striving and drive that relate to physiological variables such as cholesterol and serum uric acid, but the nature and the quality of this striving. The behavioral manifestations of striving may superficially look alike in men with high serum uric acid and in men with high levels of cholesterol, but the fact that one drives himself and the other is driven seems to distinguish those men with high levels of serum uric acid from those with high levels of cholesterol.

Suggestions

The first and foremost suggestion for future research is that the data collected for this study be more variously analyzed, and not buried in dead storage. For example, the only way we subdivided our sample was by status. It yielded the important and relevant distinction between professors and academic administrators. Beyond this it showed us that organizational rank is not the best assessment of prestige or, as we call it, objective public esteem. But the data could be divided into many more meaningful ways, by age or the academic discipline of the professor, for example.

A second suggestion that comes out of this study is the need for the collection of more objective and independent data. We tried to assess quantitative and qualitative overload by measuring the emotions that accompanied each type of overload. By so doing we opened ourselves to the critique that such a measure implied low self-esteem, that the report of high qualitative overload, for example, was in effect a statement about low occupational self-esteem. The attempt to assess overload or achievement independently, by using informants other than the professor himself, would have countered such a critique to some extent. Unfortunately, such an approach was not possible in this study.

We want to close by stating the value orientation that has crystallized as a result of this work. We feel that 'putting on the pressure' may be able to insure that a man is landed on the moon by 1970, but can it insure the creation of the ideas and theories on which such technical advances rest? Plato and Aristotle worked in leisure, and our civilization has been built on their thoughts. Kant did not write his Critique of Pure Reason until he was in his fifties, and Einstein spent ten years developing the theory of relativity. Historically, the university has been the place which told a society to stop and take stock once in a while. The tendency seems to be today to transform the university into a business concern that delivers a product: knowledge. It seems that putting on pressure and creating overload have been successful in making the university a 'going concern' whose stock is rising. But what did we lose, and, if we lost something, can we afford to lose it? We feel that it is in this direction that the investigation of overload in the academic setting should expand.

APPENDIX A

FORM LETTER INVITING THE PROFESSOR TO PARTICIPATE IN THE STUDY

The Employees Periodic Health Examination Program and the Institute for Social Research of The University of Michigan are cooperating in an inquiry into the health problems connected with work pressures.

Studies in the past have dealt with the results of diagnostic surveys, of various laboratory determinations, etc. In addition, there have been studies performed elsewhere dealing with the relationship between status and health, and work overload among executives. Since the faculty examination program as a part of a University effort recognizes responsibilities in research as well as in service, an effort is now being made to continue this kind of investigation in a university setting. For instance, there is some evidence to suggest that executives have a higher rate of ulcers than university professors and that diabetes seems to be more prevalent among professors than executives.

Therefore, in order that we may effectively enhance our understanding of the work situation of university people and of the pressures and demands made upon their time, as well as the satisfactions they achieve, we are embarking on a series of interviews and questionnaires and wish to ask for your help and cooperation.

During the next few days, Mr. Mueller, who is Assistant Study Director in charge of this project, will attempt to contact you during your office hours to talk with you further. The study is lengthy, requiring about five hours distributed over several sessions, but we believe that you will find it interesting and the sessions will be scheduled in connection with your medical appointments for the times that are most convenient to you.

The confidential nature of the findings in the Periodic Health Appraisal Program will continue to be maintained as in the past and your name and identity will not be revealed.

We will deeply appreciate your assistance in this effort to gain new knowledge about the impact of work on health as opposed to the impact of health on work.

Sincerely yours,

C. J. Tupper, M.D., Director
Periodic Health Appraisal Program

John R. P. French, Jr., Ph.D.
Program Director, Institute for Social Research

APPENDIX B

INTERVIEW AND INTERVIEW RELATED CARDS

The University of Michigan
Institute for Social Research
Employees' Period Examination Unit

WORK LOAD AND HEALTH AMONG UNIVERSITY FACULTY

(Interview on Job and Job Pressures)

Date ______________________

Identification No. __________

Project No. G-111

Interviewer ______________

INTRODUCTION

BE SURE TO MENTION THE FOLLOWING POINTS IN THE INTRODUCTION:

A. The study of overload and health

(1) The study is part of a large, joint research effort by the Employees' Periodic Examination Unit and the Institute for Social Research.

(2) The study tries to link job pressures and reactions to job pressure to physiological variables and hopefully to clinical pictures.

(3) The study will add about 5 hours to your health examination, but it will be fitted in with your health appointments so that it will not disrupt your schedule more than is unavoidable.

(4) The research is jointly supported by the U. S. Office of Education and the University of Michigan. It is, however, not associated with nor initiated by the University Administration. None of the information you give will end up in any administration file.

(5) All the information you give will be handled as absolutely confidential:

a. It is seen only by a small research team and all the information will ultimately be punched on IBM cards without identification of names.

b. Although your name is, of course, needed for your medical record, none of the questionnaires will carry your name. On these forms you are identified only by the number of your medical record. After the study is completed these questionnaires will become part of your medical record and the data will have the same degree of confidentiality.

B. The job-related interview

(1) This interview tries to get at the different aspects and facets of your job situation. In later questionnaires we will ask you specific questions. In the interview we try to get an outline and the general picture.

(2) The interview questions are by no means of an intimate nature, and in any case, you are always free not to respond. If you do respond, frankness is of the essence. Please try not to think of how your answers may appear to an outsider.

(3) Before we begin, do you have any questions?

1. One of the things that we would like to find out in our study is how people in a university setting view their jobs. How would you describe your job? What do you do?

    1a. Let us talk about these different activities in a little more detail. Can you make any finer distinctions in the different areas? How do you go about .... (teaching, doing research, etc.)?

    1b. (If not mentioned before) What about summer school teaching? Do you do any of that?

    1c. (If not mentioned before) What about extension teaching? Do you do it?

    1d. Are you engaged in any professional work off campus?

2. In general, would you say that you work hard or not very hard?

    2a. Why do you work hard (or not so hard)?

3. If by some chance you inherited enough money to live comfortably without working, do you think you would work anyway?

    3a. Why do you think you would (or would not) work?

4. (If WOULD WORK was answered above) Would you still keep on doing the same type of work you are doing now?

    4a. If yes, why?

    4b. If no, what kind of other work would you do?

    4c. Why would you do this?

5. (If WOULD NOT WORK was answered above) What would you do with your time?

    5a. Why would you do this?

6. You have said that you are working hard (or not so hard). Could you estimate how many hours per week you spend on all your professional activities? Takin an average week, how many hours do you think you work?

    6a. (If not resented) Maybe you can work it out. When do you come to the office? When do you go home? (etc.)

7. How do you feel about your performance on the job? Do you think you are doing a good job? What do you think about it?

8. How do you define a job well done? What are your standards for evaluating your performance? How do you know you have done well?

   8a. Thinking about the level of your work, its quality and quantity, what are the groups and who are the persons whose opinions are important to you? Whose praise or criticism of your job performance matters to you?

   8b. You mentioned the following persons and groups as important to you: Could you please rank order these persons and groups according to the degree to which their opinions about your work matters to you?

9. You have been describing your job generally. Could you tell me now specifically what are the things you like about your job? What are its positive aspects? What are all the things that you would call "plus" factors?

   9a. (If 'opportunity' or 'challenge' was mentioned) Are there any other opportunities (or challenges) you care to mention?

   9b. (If 'opportunity' was NOT mentioned) In addition to these positive aspects you have mentioned, do you see any special opportunities or challenges in your job?

   9c. (If 'opportunity' was mentioned either directly or through probing) Do you feel that you are making full use of these opportunities?

   9d. (If the answer to 9c is "NO") In what way do you think you are not making full use of the opportunities your job offers you?

   9e. (If the answer to 9c is "NO") How do you feel about not making full use of the opportunities of your job?

10. Now, what do you see as the pressures of your job? What are the things that put you on edge, worry you, or make you angry?

    10a. We have talked to a great number of professors and we have made a list of things they consider pressures of their job. We would like you to go over this list, even if some of the items overlap with what you have just said. In this way you may become aware of aspects of your job which you might not have otherwise thought of as pressures. Also, we are gaining this way a broader, more standardized basis for comparisons. Please go down the list and rate each item as to the degree to which it is a source of pressure on your job.

(ASK R TO TURN TO CARD A)

CARD A

1 Not a source of pressure on my job

2 Hardly a source of pressure on my job

3 Somewhat a source of pressure on my job

4 Great source of pressure on my job

____ Differences of opinion between oneself and one's superiors, chairmen, deans, research directors, etc.

____ Overwhelming work load. Too many things need to be done.

____ Lack of communication. Not learning in time of policies, changes, etc.

____ Not being able to speak one's mind.

____ The pressure to succeed.

____ Having to do things one really doesn't want to do, certain administrative duties, etc.

____ Not measuring up to the demands of the job, lack of training or knowledge, or talent.

____ Responsibility for and control of people's futures.

____ Having to put up with and tolerate incompetence.

____ Pressure to keep up with one's colleagues.

____ Not teaching as well as one would want to.

____ The pressure of "having to get along" with people.

____ Difficulties in handling subordinates, secretaries, student assistants, etc.

____ Awareness of what a struggle life really is.

____ Differences in political, social, and economical views. Differences in "Weltanschauung."

____ Not enough time to think and contemplate.

____ Having to work without adequate funds and equipment.

____ Lack of independence.

____ Being torn by conflicting demands.

____ The feeling of never having any time.

____ Some of the people around.

____ The "publish or perish" race.

_____ Difficulty of finding research money.

_____ Having no one to talk to about one's work and research.

_____ One's work not being given due credit.

_____ Not being liked personally.

_____ Not being able to allocate one's time and resources as one would wish to.

10b. How do you feel about these pressures? Do you like them? Do you dislike having them? What do you think about them?

10c. Why do you think so?

11. When you are under stress and pressure on your job, what ways have you personally found useful in handling the tensions and pressures of your job? Please give me specific examples of what you do.

11a. And if that does not work, then what do you do?

11b. I would like to ask you about two (one) specific situations. (If qualitative overload was mentioned) In cases where you find that you have to do too much, how do you react? What do you do?

Probe: (If tension coping was NOT mentioned) Such a situation in which one has too much to do usually produces a fair amount of discomfort and tension. What do you do then? How do you handle these tensions?

Probe: (If pressure coping was NOT mentioned) If you have too much to do, in what ways do you try to handle the work load? How do you deal with it?

11c. (If qualitative overload was NOT mentioned) If you feel that demands are made upon you which you cannot handle because you lack training or sufficient knowledge, what do you do?

Probe: (If tension coping was NOT mentioned) Such a situation in which one is lacking training or knowledge is usually uncomfortable and stressful. What ways have you found helpful in dealing with the tensions arising from such a situation?

Probe: (If pressure coping was NOT mentioned) In such a situation what do you do with your work load?

11d. We have talked to a great number of professors and have made a list of the things they have mentioned as ways of dealing with pressures of the job. We would like you to go over this list, even if some of the items should overlap with those you have mentioned earlier. The reading of these items might make you aware of things that you do but which you have not mentioned so far. Please go down the list and rate each item according to the choices provided on the top of Card B.

(ASK R TO TURN TO CARD B)

CARD B

1 I never cope with pressures on the job in this way.
2 I rarely cope with pressur on the job in this way.
3 I sometimes cope with pressure on the job in this way.
4 I often cope with pressures on the job in this way.

______ Withdrawing temporarily from the situation, like going for a walk, taking a long coffee or lunch break.
______ Changing to a different aspect of the task, like reading instead of writing.
______ Changing to an engrossing non-work activity, like taking off for golf, or going to a movie in the afternoon.
______ Analyzing the problem and working on a plan for solving it.
______ Just going on the same way, hoping for the best.
______ Blowing off steam, like getting irritated at whoever is around, writing a nasty letter, or telling somebody off.
______ Using a tranquilizer, stimulant or other medication.
______ Enlisting a sympathetic ear for griping about the pressures, talking to wife or colleagues.
______ Going home to take a nap.
______ Trying to build resistance to pressure by getting enough sleep and exercise.
______ Taking off for a couple of days, like going on vacations, or to a convention.
______ Making a time schedule, alloting a given amount of time for a certain activity.
______ Evading rules which cause pressures.
______ Accepting a lower degree of quality, like writing one less draft of a paper.

______ Trying to delegate work to others.

______ Avoiding the people who are the cause of pressures.

______ Engaging in political battles, "pulling rank."

______ Working evenings and weekends, taking work home.

______ Learning to take it, sweating it out, developing a thick skin.

______ Taking a strong drink.

______ Doing something that drains off aggression, like athletics, or playing bridge and poker.

______ Taking time to put things into perspective, like thinking in 50 years it will all be over.

______ Driving fast.

______ Eating more.

______ Remembering something good from the past, or thinking about something enjoyable to look forward to.

______ Turning to prayer, seeking the help of God.

______ Establishing priorities among the things that have to be done.

______ Comparing my own performance to that of others who are accomplishing less.

______ Engaging in a social activity, organizing a party.

______ Shutting out all aspects of the problem but one, solving it and proceeding to the next one.

______ Refusing any new commitments, trying to prevent pressures from arising in the future.

______ Engaging in some routine task, like bringing files up to date, or cleaning the desk.

______ Calling oneself to order, cursing at oneself.

______ Socializing with a completely different set of people.

______ Discussing topics of general interest with one's colleagues, like politics, sports.

______ Establishing priorities among tasks, omitting those of low priority.

12. Speaking more generally now, and not only thinking of the ways in which you deal with stress and pressure, what are some of the ways in which you relax? If you are run down, what recharges your batteries, so to speak?

13. We have been talking about pressures on your job. How do these job pressures compare with other pressures in your life? Are the pressures on the job greater, or less than the pressures in other areas of your life, or what do you think?

13a. Do you have the feeling that other areas of your life interfere with your job?

Probe: How much interference from other areas of your life do you feel there is?

14. So far we have been talking about 'too much.' Bur what about 'too little'? Is that a problem on your job? Do you feel that your skills and talents are not fully utilized?

14a. (If the answer to 14 was YES) Which are those skills and talents which are not fully utilized?

14b. (If the answer to 14 was NO) Are there any of your skills and talents which you would want to utilize more?

14c. (If the answer to 14 was YES) You have said that some of your skills and talents are not fully utilized on your job. What do you do? How do you react to this?

Probe: (If tension coping was NOT mentioned) Such a situation in which one cannot fully utilize what one has usually creates tension and discomfort. What ways have you personally found useful in handling these tensions?

Probe: (If pressure coping was NOT mentioned) You have pointed out how to deal with the tensions of such a situation. Now what about the situation itself? Do you try to alter it? In what way?

15. Could you please describe the kind of person who would function best in a position like yours? What kind of psychological make-up should a person have in order to do well in a job like yours?

15a. We have spoken to a great number of professors and have made a list of the qualities they have mentioned as important attributes of the personality of a professor. We would like you to go over this list and check them, even if some of the items overlap with what you have mentioned earlier. In this way we will have a broader feeling for the kind of picture professors have of themselves as a profession. The list is quite varied. Some things may be more important than others to different persons. Please go down the list and rate each item according to the alternatives provided at the top of the card. In thinking about what a professor should be like, do not consider an abstract ideal, but answer the questions for a professor in this society and in our time.

(ASK R TO TURN TO CARD C)

CARD C

1 A crucially important attribute of the personality of a professor in this society in our time

2 A fairly important attribute of the personality of a professor in this society in our time

3 A slightly important attribute of the personality of a professor in this society in our time

4 Not an important attribute of the personality of a professor in this society in our time

____ Intelligence
____ Ability to command a classroom
____ Commitment to public service
____ Stability of personality - emotional stability
____ Intellectual and personal integrity
____ Ability to plan and conceptualize research
____ Reading speed
____ Effectiveness in public affairs
____ Ability to write clearly and articulately
____ Dynamic and inspiring personality
____ Good administrative ability
____ Good speaker and debater
____ Aggressiveness
____ Creativity
____ Fairness
____ Critical mind
____ Poise
____ Persistence and tenacity in routine tasks
____ Productivity
____ Objectively
____ Thoroughness
____ Ability to work under pressure and to withstand pressure
____ Commitment to the advancement of knowledge

______ Self-discipline

______ Ability to handle public relations functions

______ Patience and understanding

______ Commitment to scientific values

______ Intellectual curiosity

______ Clear thinking

______ Cultured

______ Ability to communicate

______ Open-mindedness

______ Personal autonomy

______ Well-rounded personality

______ Expert competence in a special field, specialist

16. The next question is somewhat different and more general. It has been said that no man can live without self-esteem, without a feeling of personal worth. Usually, our self-esteem and the threats to it derive from many different areas of life. Could you please tell me what areas of your life are important to you in this respect. Which are the areas of your life whereinesuccess or failure affects the way you evaluate yourself?

Probe: (If profession was not mentioned) Does your performance on the job affect the way you feel and think about yourself?

Probe: (If husband role was NOT specifically mentioned) Does the way you behave as a husband affect the way you feel and think about yourself?

Probe: (If father role was NOT mentioned) Does the way you act as a father affect the way you think and feel about yourself?

16a. Are there any other sources which contribute either positively or negatively to the way you evaluate yourself? For example, your family background, your experiences, things like that.

17. Well, Sir, that is all for today. You have been very patient and I want to thank you. There is one other thing. We try to get as comprehensive a picture of your work situation as possible. A very important aspect of a man's work situation is the reaction of his family to the job and its demands. For this reason we would very much like to ask your wife in a questionnaire a set of similar questions, but we don't want to do this without your consent. Is it all right with you if we approach your wife?

17a. (If the answer to 17 was NO) Do you think you might feel differently if I showed you the questionnaire?

18. How do you feel about the interview. Do you think it covered important aspects of your job?

18a. Is there anything that is important to you in your attitude toward your work that I haven't asked about? Is there anything you would like to add?

APPENDIX C

LETTER REMINDING THE PROFESSOR TO RETURN THE SELF-ADMINISTERED QUESTIONNAIRES

Dear

I know how easily things can slide to the bottom of the pile, especially on a professor's desk with its multitude of forms, requests, letters, etc.

It seems that this has happened to the questionnaire which I brought you a number of weeks ago and which try to follow up the leads which you gave us in the interview you and I had a couple of months ago. I know that filling out such a set of questionnaires may seem like a difficult task, but it does not have to be. If you approach these questions with the attitude: well, let's do some self-appraisal, some job assessment, then you might possibly find it quite easy. And since everybody needs an occasional break in the flow of work you can also make these forms instruments for a temporary breathing spell. I am also sure that you appreciate the importance of complete data for any research. Since this is the intensive study of a relative small sample, each missing questionnaire hurts us especially.

With the hope that this short reminder will push our questionnaire close to the top of the pile, I am,

Sincerely,

Ernst Mueller
Assistant Study Director

EM:ad

APPENDIX D

LETTER INVITING THE WIFE TO PARTICIPATE IN THE STUDY

Your husband has probably told you that he is participating as a subject is a study inquiring into the health problems connected with work pressures. This is a rather large study supported by the US Office of Education and jointly carried out by the Employees' Periodic Health Examination Program and the Institute for Social Research of the University of Michigan.

We have been interviewing your husband about his work, its stresses, satisfactions, and his ways of coping with the problems of the job. These interviews give us a rich amount of material. The answer to some of the questions, however, is difficult to give for a man who is in the middle of things. In many cases your husband might be too close to his work to be able to clearly assess his reactions. What we need to round out our impressions are the views of a sympathetic observer. This is why we turn to you. Your husband knows of this and has expressed his approval of your taking the questionnaire.

On the one hand, a wife is involved in and affected by a man's work so that she certainly has the knowledge to answer our questions. But on the other hand, she is removed enough to be able to give us a new viewpoint. We have therefore designed a number of questions to give us a picture of how you look at your husband's reactions to his work. The questionnaire will require about thirty minutes of your time.

During the next few days Mrs. Arlene Mueller who is an assistant in this study will try to contact you and arrange an appointment at a time which is convenient to you.

The confidential nature of your answers will be maintained and your name and identity will not be revealed.

We will deeply appreciate your assistance in this effort to gain new knowledge about the impact of work on health as opposed to the impact of health on work.

Sincerely yours,

Ernst Mueller
Assistant Study Director

APPENDIX E

LETTER THANKING THE PROFESSOR FOR HIS COOPERATION

Dear

We deeply appreciate your cooperation in this research. Your generous gift of valuable time has made a significant contribution to the project and has been of real value.

The questionnaire included is the last form we will ask you to complete and it should not require more than five or ten minutes of your time. As you can see, it attempts to assess your reaction to the health examination that you have participated in over the last weeks. After you have answered the questions, please seal the form in the envelope and drop it into any mailbox.

We anticipate completion of the study in September of 1964. At that time we will send you an abstract of the report outlining the main results for your information and interest. Let me reiterate that your identity will not be revealed and your answers will be kept confidential in full accord with the principles of medical ethics and privileged communication.

Our thanks to you for your cooperation and helpfulness in what we hope will be a meaningful and fruitful enterprise.

Sincerely yours,

C. J. Tupper, M.D., Director
Periodic Health Appraisal Unit

John R. P. French, Jr.
Program Director
Research Center for Group Dynamics

GC

Enclosure

APPENDIX F

The items of the K-scale of the MMPI:

The following questions ask you to make a choice between two alternatives, "TRUE" and "FALSE" in response to certain self-descriptive statements. Please circle the choice which applies to you.

At periods my mind seems to work more slowly than usual.

I have sometimes felt that difficulties were piling up so high that I could not overcome them.

I have often met people who were supposed to be experts who were no better than I.

I find it hard to set aside a task that I have undertaken, even for a short time.

I like to let people know where I stand on things.

At times I feel like swearing.

At times I am full of energy.

At times I fell like smashing things.

I have never felt better in my life than I do now.

It takes a lot of argument to convince most people of the truth.

I have periods in which I feel unusually cheerful without any special reason.

I certainly feel useless at times.

Criticism or scolding hurts me terribly.

I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others.

Often I cannot understand why I have been so cross and grouchy.

I get mad easily and then get over it soon.

What others think of me doesn't bother me.

I have very few quarrels with members of my family.

I am against giving money to beggars.

At times my thoughts have raced ahead faster than I could speak them.

I frequently find myself worrying about something.

I worry over money and business.

It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.

People often disappoint me.

I often think, "I wish I were a child again."

I find it hard to make talk when I meet new people.

When in a group of people I have trouble thinking of the right things to talk about.

Most people will use somewhat unfair means to gain profit or advantage rather than to lose it.

It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.

I think nearly anyone would tell a lie to keep out of trouble.

APPENDIX G

CODING INSTRUCTIONS FOR THE SUBSCALES OF THE ACHIEVEMENT ORIENTATION MEASURE

Emphasis on Research

Conceptual definition

This dimension was chosen to assess status striving, preoccupation with prestige, and concern for that line of effort which promises the greatest external rewards in terms of status and public esteem.

Operational definition

(a) High: Clear indication that research is preferred over teaching. Teaching is seen as helping and furthering research, not the other way around. Such a person is likely to be involved in a good deal of research administration, because of the number and magnitude of his projects.

(b) Medium: Not active in all phases of research. More one-track minded. Fewer projects and more time spent on teaching. Projects are undertaking without specific concern for their promise of success or limited to those that yield publishable results in a relatively short time.

(c) Low: Clear indication that the man prefers teaching over research. Research is seen as helping and furthering teaching, not the other way around. Only lip service is paid to research.

Example of 'high': "Research is my raison d'être."

Example of 'low': "I am not trained in research. I am trained in teaching. The first time I walked into a classroom I knew that was for me."

These examples -- though in quotation marks -- are not actual quotations of a single individual, but condensations from the interviews of several persons designed to show the meaning and the flavor of the particular dimension.

Interview questions used in the assessment

It should be pointed out that none of the dimensions are assessed exclusively on the basis of the questions listed below. The questions listed indicate, however, likely points at which answers relevant to this dimension might occur.

Question: 1 to 1d, 9 to 9e, 14 to 14c, 15

Difficulty in assessing this demension

What is the equivalent for research in the humanities, or fields like music is not always easy to decide. Is writing think-pieces in philosophy research? We tried to solve this difficulty by asking, "Is this an activity which is likely to increase the person's prestige?" In the future, a more specific approach to this dimension might be not to ask for the emphasis on research but for the emphasis on publishing and making oneself visible.

Leadership

Conceptual definition

Under 'leadership' we understand here the desire to lead and guide others by persuasion toward a common goal. This variable is not just indicative of authoritarian control.

Operational definition

(a) High: Just liking people is not enough. The person must indicate that he wants to mold other people in some way, to change them. Psychotherapists would be rated high on this dimension. If this manipulating of others for the sake of a common goal is done against obstacles and resistance, we have an especially strong case of manipulation.

(b) Medium: The expressed concern for the course of human relationships without evidence that the person actually makes the attempt to manipulate others.

(c) Low: Specific expression of the desire to work alone, to remain free from interpersonal entanglements. The willingness to let others do the guiding, persuading, and controlling. However, it does not mean that the person himself wants to be manipulated by those others to whom he is willing to leave the job of handling social relations.

Example of 'high': "I like to work with people more than with problems. People want to be appreciated and I try to see that they feel they are. I have to keep morale at a high level."

Example of 'low': "I wish they would leave me alone with those assignments. I don't like to direct people and see that they do what they are supposed to be. I never could be a chairman."

Interview questions used in the assessment

Question: 1 to 1d, 15

Difficulty in assessing this dimension

It is sometimes difficult to assess the meaning of a man's administrative duties. A lot of administration is paperwork and does not involve the dealing with people. Furthermore, it is difficult to assess this kind of leadership in young people who are hampered in the expression of this tendency by their position.

We tried to counter this difficulty by ruling out administrative paperwork as indicative of this kind of leadership and by changing our value standards according to age and position of the subject.

Range of Activities

Conceptual definition

Diversified professional involvement is the concept we try to assess. Only further investigation can show whether diversified professional involvement is important to achievement orientation in its own right or because it reflects status striving and leadership.

Operational definition

(a) High: We are looking here for indications that the professor does not only use his professional skills within the strict triad of the academic position, teaching, research, and administration, but is inclined to extend the definition of his job and carry professional skills into off-campus activities. Activities that are strictly hobbies or that involve him in role other than that of professor are not counted. We are also looking for indications that the taking on of these activities is not particularly limited by devotion to the family.

(b) Medium: The number of these activities described above is smaller and they are more immediately job related like private students for a music professor, or a private practice of a professor in the medical school.

(c) Low: There are few or no activities which are not directly job connected.

Example of 'high': "Oh, yes, I am involved in much more than the job requires. I am consultant to the surgeon general, to communities in Mexico, and the National Commission for Equal Employment Opportunities. I also serve on other state boards and commissions."

Example of 'low': "No, I don't do any consulting. My project does not leave me time for anything else. I constantly turn things down."

Interview questions used in the assessment

Question: 1 to 1d, 2a

Difficulty in assessing this dimension

It is not always easy to separate activities which are done for extraneous reasons like need for additional income from a high level of work involvement. There is also the problem of how to assess this variable in young men who have less chance to get involved and old men who were involved once but are no longer.

We tried to alleviate this problem by weighing outside lecturing and consulting lightly in comparison to activities which are known to carry no remuneration. For the evaluation of this dimension in young people we changed our value standards. Old men who once had been involved in a wide variety of activities were rated 'medium'.

Pushing of Self

Conceptual definition

Strength of the work related superego demands for achievement and relentless striving.

Operational definition

(a) High: We took the number of work hours reported by the professor as an indication of superego demands. If there were indications that the professor worked long hours in order to further his career and his professional prestige, this increased our rating. Such persons are likely to complain about the pressure, but there is no evidence that they do anything about it. One gets the feeling that while they may not acknowedge it, they would not be happy any other way. All indications of guilt about not working more tend to push the rating higher.

(b) Medium: All of the above, but to a lesser degree.

(c) Low: Feeling of living a relaxed life is taken as an indication that the professor does not push himself very hard.

Example of 'high': "The work demands these long hours. In terms of accomplishments I often feel I am not making full use of the opportunities of the job. I feel quite guilty sometimes."

Example of 'low': "The job does not weigh on me. I don't mind sneaking out for golf once in awhile. I suppose nobody ever makes full use of his opportunities, but I would not know how to do it better."

Interview questions used in the assessment

Question: 2 and 2a, 6, 9c to 9e, 10b and 10c, 14 to 14c, Card A

Difficulty in assessing this dimension

Here it is often difficult to assess the difference between what the professor says and what he does. It is sometimes difficult not to be stunned by flashy answers. Does the man really feel guilty about not working more or is he simply being coy?

There was no fully satisfactory way of solving this problem in the present interview. We tried to use our awareness of the problem as a corrective.

Achievement and Self-Confidence

Conceptual definition

We do not have a specific conceptual definition for this dimension. We included it on the assumption that among men of high ability in positions with considerable opportunities for achievement, achievement orientation should be followed by actual achievement and correspondingly high self-confidence.

Operational definition

(a) High: Any objective evidence of actual achievements pushes the rating up, publications, honors, positions held. Men who have done a lot of good work know it, and without particularly asking them it expresses itself in the interview. Statements like 'I did' or 'I was' are frequent among these men. Shortcomings are stated matter-of-factly without feeling guilty about them.

(b) Medium: Less indication of demonstrable achievement. Somewhat more concern with deficiencies. Less reference to the profession at large as a reference group.

(c) Low: High emphasis placed on superiors as reference persons. Clear indication of lack of self-confidence. Mostly concerned with the immediate demands of the job.

Example of 'high': "The opportunities are unlimited. I am making use of them to the extent of the time I have. I do as much as I can and don't lose sleep over not being able to do things. I think I am better in research than most people I know and my publications and the reactions to them prove it."

Example of 'low': "I am doing a poor job. I am depressed. I could not get any recommendations from this place were I to leave. I have put in two years of unproductive work."

Interview questions used in the assessment

Question: 1, 7, 9d and 9e

Difficulty in assessing this dimension

In order to evaluate achievement it is clearly necessary to establish some kind of time/achievement ratio since it is obviously not appropriate to expect from a beginning assistant professor the same achievements as from a seasoned full professor. In this study this was not done in any formal way. Only the awareness of the problem was used as a corrective.

Attitude Toward Pressure

Conceptual definition

We don't have a conceptual definition of this variable. We included it on the basis of the assumption that men with high achievement orientation should thrive on pressure, enjoy it, and show an aggressive and optimistic outlook on life. This variable correlates least (r = .42) with the total achievement orientation score. The measurement would either have to be redesigned or perhaps the dimension should be dropped in future work.

Operational definition

(a) High: The clear statement or the clear implication that the man likes pressure, thrives on it, and would not want to be without it.

(b) Medium: People rated 'medium' accept pressures as a fact of life but feel ambivalent about them.

(c) Low: Clear statement that the person dislikes pressure.

Example of 'high': "I work better under pressure. I don't know why I put these pressures on myself. Maybe I like to get things done and need pressure to do it."

Example of 'low': "I dislike pressure. Who wants to feel pinched?"

Interview questions used in the assessment

Question: 10b

Difficulty in assessing this dimension

Here there is again the problem of whether or not we can trust the answers, and whether or not the professors answer the question with respect to pressures too specific to allow for an assessment of the general attitude toward pressure. Furthermore, in contrast to the other dimensions, the evaluation here rests heavily on the answers to a single question. We did not solve the measurement problems connected with the assessment of this dimension.

Drive

Conceptual definition

The concept we try to measure is that of energy output. This is a summary variable in which we try to tap a life style. How much intensity does the man put into all his actions, that is the question.

Operational definition

(a) High: The man gives the impression that he constantly uses all his energies to reach his goals, whatever they are. The impression that the man is constantly running at top speed is pushing this rating up.

(b) Medium: All of the above but to a lesser degree.

(c) Low: All indications that express that the man is retiring, taking it easy, and looking for the good life.

Interview questions used in the assessment

The assessment of this dimension did not depend on the consideration of specific questions but on the impression gained from the interview as a whole.

Difficulty in assessing this dimension

Since the assessment of this dimension cannot be pinned down to a consideration of the answers from specific questions it leaves greater room for subjectivity in evaluation.

APPENDIX H

INTERRATER CORRELATION AND ESTIMATED RELIABILITY OF THE SEVEN SUBSCALES OF THE ACHIEVEMENT ORIENTATION MEASURE

	Interrater correlation	Estimated reliability
Emphasis on research	.85	.92
Leadership	.67	.80
Range of activities	.72	.84
Pushing of self	.55	.71
Achievement/Self-confidence	.55	.71
Attitude toward pressure	.74	.85
Drive	.61	.76

APPENDIX I

FACTOR LOADING OF THE ITEMS COMPOSING THE TWO OVERLOAD SCALES

Quantitative Overload (Factor QT)

Item	Loading on factor QT	Loading on factor QL
Overwhelming work load. Too many things need to be done.	-.69	-.22
Having to do things one does not really want to do.	-.45	-.06
Not enough time to think and contemplate.	-.71	.05
Being torn by conflicting demands.	-.55	-.33
The feeling of never having any time.	-.78	-.15
Not being able to allocate one's time as one would wish.	-.69	-.15

Qualitative Overload (Factor QL)

Item	Loading on factor QT	Loading on factor QL
The pressure to succeed	-.13	-.73
Not measuring up to the demands of the job	-.12	-.47
Pressure to keep up with one's colleagues	-.18	-.71
The "publish or perish" race	-.11	-.81

APPENDIX J

QUESTIONNAIRE FORM USED TO ASSESS THE DEGREE TO WHICH THE SELF IS SEEN AS THE FOREMOST SOURCE OF PRESSURE

Job pressures as well as other pressures vary as to the source of these pressures. A university ruling would be an environmental source of pressure. But pressures are also created within the person himself through hopes, fear, aspirations, and internalized standards of conduct. For example, if you decide to do first rate research, although nobody asks you to do so, then you yourself are the source of pressure. It is not always easy to ascertain for oneself where the actual source of pressure lies, but please try.

Ask yourself: do I feel any pressure arising from this activity? Then ask yourself: who is really responsible for this pressure.

Check AS MANY choices as you feel are appropriate. If you feel that there is more than one source of pressure connected with a given activity, then please RANK ORDER the sources, '1' being the main source of pressure and so forth. If you feel the source of pressure is not listed among the choices provided then please WRITE IN what you consider the source of pressure to be. If no pressure arises from a given activity, then please check the first column.

The source of the pressures created by this activity lies in the...

Name of activity or activities:	No pressure felt	standards of the profession	standards of this institution	standards among my colleagues	level of my own standards	Other sources. (Please write in the source, if not mentioned).
___________________	___	___	___	___	___	___
___________________	___	___	___	___	___	___
___________________	___	___	___	___	___	___

APPENDIX K

QUESTIONNAIRE FORM USED TO ASSESS THE PERCEIVED LEGITIMACY OF THE PRESSURE

If any of the job activities listed below act as a source of pressure in your life, please indicate whether you view these pressures as arising out of demands which YOU accept as justified, reasonable, and legitimate; or whether you view these pressures as arising out of unjustified or arbitrary impositions. For example, a chairman's demand to take over an eight o'clock class may seem legitimate to a new Ph.D., but may be viewed as an unjustified or arbitrary request by a full professor with high seniority.

Please place a checkmark on each line in the appropriate place. Do not hesitate to use all parts of the scale. If you don't feel any pressure with respect to this activity, check the first column.

I consider the pressures which arise in connection with this activity...

Name of activity or activities:	No pressure felt. Question doesn't apply.	very legitimate	somewhat legitimate	neither legitimate nor illegitimate	somewhat illegitimate	very illegitimate
____________________	___	___	___	___	___	___
____________________	___	___	___	___	___	___
____________________	___	___	___	___	___	___
____________________	___	___	___	___	___	___

APPENDIX L

QUESTIONNAIRE FORM USED TO ASSESS THE DEGREE OF SUBJECTIVE PUBLIC ESTEEM

In these questions we try to learn what others in your field think of you professionally. Below, you will find the list of abilities and attributes which you mentioned in our interview. For each one please answer two questions:

1. How are you presently evaluated professionally by those persons and groups in your field whose opinions matter to you?

2. What professional evaluation are you striving to achieve among those persons or groups in your field whose opinions matter to you?

Below, the number '1' represents a low evaluation, the number '7' a high evaluation. For each question select the appropriate numerical value and circle it. After you have considered each ability or attribute, there should be TWO encircled numbers, one pertaining to question 1, the other to question 2. Do not hesitate to use all parts of the scale.

With respect to the attribute or ability listed below ...

Name of ability or attribute:	The present evaluation of me by those in my field whose opinions matter to me is:
______________________	1 2 3 4 5 6 7
______________________	1 2 3 4 5 6 7
______________________	1 2 3 4 5 6 7
______________________	1 2 3 4 5 6 7

APPENDIX M

QUESTIONNAIRE FORM USED TO ASSESS THE DEGREE OF OCCUPATIONAL SELF-ESTEEM

The degree of a given quality does not--by itself--indicate whether or not you are satisfied with the way you stand on that quality. There is probably no one who can say: "I'm perfectly satisfied with my degree of ability as it is; I don't want to change at all." Usually, people would like to change, but differ as to the kinds of attributes and abilities about which they are dissatisfied and in which they would like to see some change come about.

Below, you will find the same list of traits that you have been using in Part I. Please indicate for each trait how satisfied or dissatisfied you are with the amount of talent you have at present.

Place a checkmark on each line at the appropriate place. Do not hesitate to use all parts of the scale.

With respect to the ability or attribute listed below ...

Name of ability or attribute:	I am very dissatisfied with my present degree of talent or skill	I am somewhat dissatisfied	I am neither satisfied nor dissatisfied	I am somewhat satisfied	I am rather satisfied with my present degree of talent or skill
________________	___	___	___	___	___
________________	___	___	___	___	___
________________	___	___	___	___	___
________________	___	___	___	___	___

APPENDIX N

CODING CATEGORIES FOR THE CLASSIFICATION OF THE VARIOUS DEPARTMENTS

Physical sciences	: Astronomy Biochemistry Chemistry Mathematics Physics
Life sciences	: Botany Genetics Zoology
Social sciences	: Anthropology Political Science Psychology Social Work Sociology
Business administration/ economics	: All fields represented in the school of business administration and the department of economics
Medicine	: All branches of medicine including: Anatomy Dentistry Pathology Psychiatry
Engineering	: All fields represented in the college of Engineering, and also Meterology Wood technology
Liberal Arts	: History Languages Philosophy Speech
Public Health	: All fields represented in the school of Public Health
Music	: All fields represented in the School of Music
Education	: All fields represented in the School of Education, including physical education
Other	: Miscellaneous departments: Journalisms, law, architecture, art

APPENDIX O

CODING CATEGORIES FOR THE ANSWERS TO THE QUESTION: "IN GENERAL WOULD YOU SAY THAT YOU WORK HARD OR NOT VERY HARD?"

In general would you say that you work hard or not very hard? (Q. 2)

1. Very hard

2. Hard

3. Qualified 'hard' and 'average'

   Pretty hard
   Harder than average
   People say I work hard, but I don't feel I am working to capacity
   I don't think I work too hard, generally just normal

4. Avoids a clear answer

   I am tired when night comes
   Hard is relative
   I don't work more than I should
   I have never asked myself that
   Pretty hard to say
   I worked harder in the past
   I don't get much done anymore

5. Not hard

   I don't work hard

APPENDIX P

CODING CATEGORIES FOR THE ANSWERS TO THE QUESTION: "WHY WOULD YOU WORK (IF YOU DIDN'T HAVE TO)?"

Why would you work, (if by some chance you inherited enough money to live comfortably without working)? (Q. 3a)

Funktionslust, enjoyment of activity

Here are to be coded all indications that the man feels and intrinsic need to be active without specifying any particular reasons or motives.

Examples: I enjoy it
It is in my glands
I would not be happy without something to do
I am not conscious of the energy it takes
The body needs activity

Nature of the work and self-utilization

Here are to be coded all indications that the man is driven to work by an intrinsic interest in the nature of the work and the need to utilize his skills and talents.

Examples: I am interested in the work
I get fascinated by ideas
I like my job
It is a challenge
Basically, I don't like anything better

Work as a moral value

Here are to be coded all indications that the man perceives work as having an intrinsic moral value for its own sake.

Examples: I was brought up that way
It is my philosophy of life
It would violate my standards, if I didn't work hard
This is my life, this is my religion
Without a job people float and flounder
Without it life would have no purpose

Success striving and striving for recognition.

Here are to be coded all indications that the man works in order to achieve success, an extrinsic goal, which is not inherent in the nature of the work itself but nevertheless a goal of the person himself.

Examples: I like to be a leader in the field
Because I am vain and have to keep a reputation
I want to get ahead
If you want a promotion, you have to turn out work
Without hard work success would be impossible
I like to publish
I want regard, I want to count

Social pressure

Here are to be coded all indications that the man works because he feels the social pressure to do so. In contrast to success striving as a reason for working this is seen by the person as an external force impinging upon him.

Example: social pressure

Job pressure (overload)

Here are to be coded all indications that the man works because he sees the job as an external force, obliging him to work. He works because for what reason ever he can't or won't escape the commitments he has taken on.

Examples: I am driven by projects
The pressure of the new course
The job has to be done
There is no choice
You accept something and then you are commited

Satisfaction of other extrinsic needs and values

Here are to be coded all indication of other motivations originating in the person but not intrinsically tied to the nature of the job.

Examples: Concern for the community
I want responsibility
I want to help people
I want to contribute
The satisfaction of accomplishing something
It allows me a style of life I would not have otherwise
I want salary raises

Others (including unclear answers)

Here are to be coded all comments that don't fit into any of the other categories and those that are unclear.

Examples: I always have worked hard
It is more interesting to work hard than not to
I am basically happier if I work hard

APPENDIX Q

CODING CATEGORIES FOR THE ANSWERS TO THE QUESTION: "COULD YOU TELL ME SPECIFICALLY WHAT ARE THE THINGS YOU LIKE ABOUT YOUR JOB?"

Could you tell me specifically what are the things you like about your job? (Q. 9)

Freedom and independence

Here are to be coded all comments about freedom to arrange one's time, work, and all comments about independence and being one's own boss. Also: all comments concerning academic freedom as a political issue.

Examples: Academic freedom
Freedom of work and time
I am my own boss

1. This category is mentioned

0. This category is not mentioned. Inapplicable

The interpersonal relations

Here are to be coded all comments about pleasant and enriching professional and personal relations. Also: references to the competence of colleagues.

Examples: The kind of people one associates with
Competent colleagues
Cross fertilization
The lack of artificiality
The privacy a large university gives you

The academic way of life

Here are to be coded all comments about university life or university atmosphere in general without mentioning any particular aspects.

Examples: I like university life
The intellectual atmosphere
The university atmosphere
The opportunities of a university community

The nature of the work and self-utilization.

Here are to be coded all comments indicating that the man finds satisfaction in the nature of the work and that it allows him the use of his skills and talents. This category is differentiated from several others by the fact that the nature of the work is mentioned in general terms, without giving particulars. Also to be coded here are all comments about the satisfaction of personal need excluding, however, status striving and the need to help and contribute.

Examples: The work is fascinating
I like this work best
Every day I do what I think is important
It satisfies my curiosity
It satisfies personal needs
I am best qualified to do this
It capitalizes on my experience
I do what I want to do

Teaching and the teaching situation

Here are to be coded all comments expressing satisfaction with teaching as a particular aspect of the job and with particular favorable arrangements of the teaching situation.

Examples: Developing young people
The imparting of knowledge
Working with good students
Light teaching load
Teaching advanced courses
I enjoy teaching

Research and the research situation

Here are to be coded all comments expressing satisfaction with the research as a particular aspect of the job and with the particular favorable arrangements of the research situation.

Examples: I enjoy research
Ease of obtaining funds
Potential of the job for research
Facilities

Variety

Here are to be coded all comments expressing satisfaction with the variety of tasks involved in the job. Also to be coded here are all indications that the man is glad to have a balance of duties.

Examples: I have to have variety
I want a balance
Teaching and research

Self-development and challenge

Here are to be coded all comments expressing satisfaction because the job allows for personal growth, and because it constitutes a challenge.

Examples: The challenge
Opportunity for growth
Pressure to keep up to date
Opportunity to learn more about the field
Being at the center of my work
The creativity of the job

Good working conditions

Here are to be coded all comments expressing satisfaction with this or that external aspect of the work situation, excluding, however, all comments mentioning tangible rewards.

Examples: Little politics
Low level of pressure
Tolerant superiors
The contacts you can build up
Not as production oriented like industry
I like the team approach
The support the university gives to my work

Prestige of the university and the profession

Here are to be coded all comments expressing satisfaction with the prestige of the university, school, or department. Also: all prestige oriented comments in general.

Examples: Privilege to be at a good school
Prestige
The status you have as a professor

Tangible rewards

Here are to be coded all comments expressing satisfaction with the external rewards that go with the job, excluding, however, those that go with living in a particular town.

Examples: Salary
Security
Relatively large amount of vacation
Fringe benefits
I get to travel
Opportunities for outside work

The community

Here are to be coded all comments expressing satisfaction with living in a particular community without mentioning the university affiliation of that town.

Examples: Living in Ann Arbor
A good place to raise the kids

Opportunity to help, contribute, and to be of service

Here are to be coded all comments expressing satisfaction with the opportunities the job offers to help others, to contribute something, and to be of service.

Examples: I have a message
One thinks one has to make a contribution
I want to help
I can help people

Influence and responsibility

Here are to be coded all comments expressing satisfaction with the fact that the job carries responsibility and influence.

Examples: The responsibility my work carries
The influence you wield

Other

Here are to be coded all comments expressing satisfaction with aspects of the job which do not fit into any of the previous coding categories.

APPENDIX R

CODING CATEGORIES FOR THE ANSWERS TO THE QUESTIONS ASKED OF THE WIFE ABOUT THE LEISURE TIME ACTIVITIES OF THE HUSBAND

"When your husband comes home, what are some of the ways in which he relaxes?" "Could you tell us how your husband usually spends his weekends?"

Activities with wife and family

This includes everything the man does with his wife and family. But it excludes socializing with others. It also excludes going to movies, plays, sport events unless the family is specifically mentioned.

Examples: "Helps, or plays with me"
"Plays with the baby"
"The family dinner hour"
"Excursion day with the family"
"Sex"
"Helps children with the schoolwork"
"Encourages meal preparation"

Professional work

This includes everything the man does for his work either at home or by going back to the office, lab. or by going to meetings.

NOTE: If it says something like "works on the project" without elaboration, code this as referring to professional work.

Examples: "Out of town conferences"
"Attends meetings, lectures"
"Correspondence", "Prepares for classes"
"Works at lab."
"Reads technical reports"
"Plans the next day, makes lists"

Reading for relaxation

NOTE: If it just says "reading" code this under this category, reading for relaxation.

Examples: "Reads the paper", "Reads magazines"
"Non-technical reading"
"Reading for pleasure"

House and household maintenance

Into this category belong all the "do-it-yourself" activities which cannot be recognized as hobbies. Here also belong such things as errands, paying of bills, reading the mail, taking care of the car, etc.

Examples: "Errands around town", "goes shopping"
"Care of basement and garage"
"Gardening and outdoor chores"
"Putters around the house, garden"
"Looks at mail"

NOTE: If "gardening" is mentioned without any further elaboration, then code it under hobbies.

Hobbies

In this category belong all purposeful but relaxing hobby activities with the exception of athletic activities.

Examples: "Current project - painting, furniture refinishing"
"Crossword puzzles", "Guitar practice"
"Hobbies and the like"

Athletic activities

This includes all physical and sports activities but not walking and camping.

Examples: "Golf", "Athletics", "Sailing", "Tennis"

Spectator relaxation

This includes activities in which the man participates as a passive spectator, movies, TV, sports events. It does not include concerts and plays.

Examples: "Spectator sports", "Movies", "Watching TV".
"Watches news on TV".

Socializing

This includes all activities with people other than one's immediate family, though members of the immediate family may also be present.

Examples: "Visiting family"
"Plays host", "Friends for bridge"
"Entertain or be entertained"
"Socializing, guests or parties"

Intellectual pursuits

This refers to intellectual activities outside the house but not connected with the work.

Examples: "Plays", "concerts", "art exhibits", etc.

Civic activities

This includes all the work done for church, community, schools, etc. It also includes simply going to church.

Examples: "Army reserve meeting", "church"
"Prepares Sunday School class"
"Boy scouts"

Plain relaxing

This includes all the activities which just seem to provide a transition from work to home, or which take the mind off things, plus plain loafing.

Examples: "Nothing", "Taking shower", "Eating", "Dinner"
"Mixing a drink", "Sleeping long", "Walking"
"Wandering around the shops", "Nap"
"Changing clothes", "Listening to music", etc.

Other

Here should be coded everything that does not fit into any of the former categories. This is the waste basket category. You should find it only very rarely necessary to use it.

APPENDIX S

CORRELATION OF ACHIEVEMENT ORIENTATION AND SERUM URIC ACID IN THE FOUR STATUS GROUPS

	Correlation with serum uric acid			
	Assistant professor	Associate professor	Full professor	Administrator
	N = 35	N = 19	N = 24	N = 9
Emphasis on research	.32	.10	-.06	.61
Leadership	.56[a]	.40	.47	(*)
Range of activities	.40	.31	.33	.36
Pushing of self	.56	-.04	.37	.66
Achievement/self-conf.	.64	.54	.35	.59
Attitude toward pressure	-.02	.41	.06	.52
Drive	.71	.52	.29	.40
A O R score	.72	.54	.49	.78

[a] Correlations significant at the .05 level or better are underlined

(*) Computation of the correlation coefficient was not possible since all administrators received equally the highest rating (3) on this subscale.

APPENDIX T

ITEMS AND INSTRUCTIONS OF THE WORRY INDEX

All of us occasionally feel bothered by certain things in our work. Here are a list of things that sometimes bother people; I would like you to check how often you feel bothered by them.

A. Feeling that you have too little authority to carry out the responsibilities assigned to you?

B. Being unclear on just what the scope and responsibilities of your job are?

C. Not knowing what opportunities for advancement or promotion exist for you?

D. Feeling that you have too heavy a workload, one that you can't possibly finish during an ordinary workday?

E. Thinking that you'll not be able to satisfy the conflicting demands of various people over you?

F. Feeling that you're not fully qualified to handle your job?

G. Not knowing what your colleagues think of you, how they evaluate your work?

H. The fact that you can't get information needed to carry out your job?

I. Having to decide things that affect the lives of people you know?

J. Feeling that you may not be liked and accepted by the people you work with?

K. Feeling that you are failing to get ahead?

L. Feeling that I am "in a rut"?

M. Possibility of losing this job?

N. Money problems?

O. My own health?

P. Feeling that I don't put enough effort into the job?

Each variable was measured on a five-point scale ranging from "Never" to "Nearly all the time". A sixth category "Doesn't apply" was included. A person's score is the average of his ratings on all items not rated "Doesn't apply".

APPENDIX U

Intercorrelation Matrix of the variables used in this study,
not corrected for defensiveness[a,b]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Occupational self-esteem																								
2. Quantitative overload	-.23																							
3. Qualitative overload	-.37	.38																						
4. Self as source of pressure	-.05	-.08	-.10																					
5. Legitimacy of pressure	.17	-.36	-.12	.26																				
6. Subjective public esteem	.54	-.19	-.50	.14	.29																			
7. Achievement orientation	.10	.14	-.19	.09	.00	.20																		
8. Emphasis on research	-.27	.12	.16	.22	-.06	-.30	.40																	
9. Leadership	.19	.14	-.27	-.08	-.04	.36	.65	-.16																
10. Range of activities	.26	.06	-.41	.03	.10	.37	.60	-.06	.47															
11. Pushing of self	-.19	.33	.14	.07	-.09	-.02	.63	.38	.30	.11														
12. Achievement/Self-confidence	.28	-.09	-.37	.05	.08	.30	.79	.23	.50	.50	.28													
13. Attitude toward pressure	.15	-.09	.03	.04	.09	.05	.43	-.02	.17	.13	.10	.27												
14. Drive	.02	.16	-.06	.07	-.07	.09	.85	.32	.52	.35	.67	.62	.33											
15. Age	.23	.03	-.40	-.08	-.08	.19	.06	-.27	.28	.30	-.17	.15	.05	-.09										
16. Status	.23	.02	-.45	-.02	.03	.25	.31	-.16	.44	.40	-.01	.38	.12	.12	.71									
17. Serum uric acid	.07	.03	-.08	.06	.08	.15	.59	.20	.47	.36	.39	.48	.16	.50	.09	.16								
18. Cholesterol	.03	-.10	-.03	-.07	-.10	-.06	.03	-.06	.13	.11	-.07	.09	-.11	-.01	.19	.11	.22							
19. Diastolic blood pressure	.20	-.01	-.19	-.23	-.06	.16	.24	.05	.16	.28	.11	.22	.07	.15	.30	.20	.17	-.01						
20. Obesity	.00	-.10	-.10	-.11	-.03	.12	.18	-.10	.34	.26	.08	.17	-.10	.11	.10	.07	.26	.01	.17					
21. Defensiveness	.44	-.19	-.35	-.18	.11	.36	.12	-.31	.16	.31	-.17	.29	.19	.05	.21	.13	-.08	-.06	.09	.02				
22. Work hours (husband's report)	-.01	.18	-.11	.04	-.14	.09	.43	.17	.26	.27	.48	.34	-.04	.42	-.11	.04	.08	-.09	.13	.18	.08			
23. Work hours (wife's report)	.18	.03	-.15	.04	-.10	.12	.10	.14	-.01	.13	.09	.10	-.16	.13	-.16	-.15	.04	-.10	.03	-.02	.01	.29		
24. Worry (husband's report)	-.44	.41	.58	-.10	-.35	-.46	-.15	.12	-.20	-.30	.13	-.27	-.08	.01	-.26	-.34	-.12	.04	-.10	.04	-.34	.03	-.16	
25. Worry (wife's report)	-.30	.26	.45	.03	.20	-.33	-.17	.11	-.24	-.30	.13	-.34	.07	-.08	-.16	-.26	-.20	.02	-.05	-.13	-.31	-.07	.03	.44

a Correlations significant at the .05 level or better are underlined

b The number of cases varies due to missing data.
The data are for the sample as a whole, including the administrators

APPENDIX V

Intercorrelation Matrix of the variables used in this study, corrected for defensiveness.[a,b]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Occupational self-esteem																								
2. Quantitative overload	-.16																							
3. Qualitative overload	-.26	.34																						
4. Self as source of pressure	.05	-.11	-.17																					
5. Legitimacy of pressure	.13	-.35	-.09	.29																				
6. Subjective public esteem	.46	-.14	-.43	.22	.14																			
7. Achievement orientation	.06	.17	-.16	.11	.01	.17																		
8. Emphasis on research	.15	.06	.06	17	-.03	-22	.47																	
9. Leadership	.13	.18	-.23	-.05	-.06	.36	.64	-.12																
10. Range of activities	.14	.13	-.36	.10	.07	.30	.60	.04	.45															
11. Pushing of self	-.13	.31	.09	.04	-.07	.04	.66	.35	.34	.17														
12. Achievement/Self-confidence	.17	-.03	-.30	.11	.05	.22	.80	.34	.48	.45	.35													
13. Attitude towards pressure	.08	-.05	.11	.07	07	-.02	.42	-.04	.15	.08	.14	.22												
14. Drive	.00	.17	-.04	.08	-08	08	.85	.36	.52	.35	.69	.64	.33											
15. Age	.16	.07	-.36	-.04	-.10	.09	.03	-.22	.26	.25	-.14	.10	.01	-.10										
16. Status	.19	.04	-.45	.00	.02	.22	.30	-13	.43	.38	-.08	.35	.10	.11	.70									
17. Serum uric acid	.12	.01	-.12	.05	.09	.19	.61	.19	.49	.41	.39	.52	.18	.50	.05	.16								
18. Cholesterol	.07	.09	-.05	-.08	-.09	-.04	.03	-.08	.14	.14	-.08	.11	-.10	-.01	.20	.12	.22							
19. Diastolic blood pressure	.18	.01	-.17	-.21	-07	.14	.23	.09	.15	.27	.13	.20	.05	.15	.29	.19	.16	-.11						
20. Obesity	-01	.11	-.10	-.11	-.03	.12	.18	-.09	.35	.26	.08	.17	-.10	.11	.10	.07	.26	.01	.17					
21. Defensiveness	.44	-.19	-.35	-.18	.11	.52	.12	-.31	.16	.31	-.17	.29	.19	.05	.21	.13	-.08	-.06	.09	.02				
22. Work hours (husband's report)	-06	.21	-09	.05	-.15	.06	.42	.21	.26	.27	.50	.34	-06	.42	-.13	.03	.08	.18	.05	.18	.08			
23. Work hours (wife's report)	.20	.03	-.16	.04	-.10	.13	.10	.15	-.01	.14	.09	.10	-16	.13	-.16	-.15	.04	-.10	.03	-.02	.01	.29		
24. Worry (husband's report)	.35	.40	.52	-.17	-.33	.39	-.12	.01	-.18	-.21	.08	-.19	-.02	.03	-.21	-.32	-.14	.05	-.08	-03	-.34	.07	-.17	
25. Worry (wife's report)	.19	.22	.38	-.03	-.18	.25	-.14	.01	-.20	-.22	.09	-.27	.14	-.06	-.10	-.23	-.24	.00	-.02	-.13	-.31	-.05	.03	.37

[a] Correlations significant at the 0.05 level or better are underlined

[b] The number of cases varies within this table due to missing data
The data are for the sample as a whole, including the administrators

REFERENCES

Abell, L. L., Levy, Betty B., Brodie, B. B., & Kendall, F. E. A simplified method for the estimation of total cholesterol in serum and demonstration of its specificity. Journal of Biological Chemistry, 1952, 195, 357.

Adlersberg, D. Newer advances in gout. Bulletin of the New York Academy of Medicine, 1949, 25, 651.

Allport, G. W. The ego in contemporary psychology. Psychological Review, L, 1943, 451-478.

Allport, G. W. Becoming: basic considerations for a psychology of personality. New Haven: Yale University Press, 1955.

Austin, C. G. Self-identity and role-identity in the selection of college teaching as a career. Unpublished doctoral dissertation, University of Michigan, 1965.

Barry, P. E., Dawber, T. R., Hall, A. P., & McNamara, Patricia M. Uric acid, gout, and coronary heart disease: observation from the Framingham study. Paper read at American Public Health Association, New York, October, 1964.

Barzun, J. Teacher in America. Boston: Little, Brown & Co., 1945.

Bunnell, Kevin (Ed.) Faculty work load, a conference report. Washington: American Council on Education, 1960.

Cannell, C., & Fowler, F. J. Comparison of hospitalization reporting in three survey procedures. Health Statistics, 1963, Series D, No. 8.

Caplow, T., & McGee, R. J. The academic marketplace. New York: Basic Books, 1958.

Cattell, R. B., & Scheier, I. H. The meaning and measurement of neuroticism and anxiety. New York: Ronald Press, 1961.

Cobb, S. Hyperuricemia in executives. In: The Epidemiology of Chronic Rheumatism. Kellgren, J. H., Jeffrey, M. R., and Ball, J. (Eds.) Philadelphia: F. A. Davis, 1963.

Cobb, S. The epidemiology of gout--a review. Paper read at American Public Health Association, New York, October, 1964.

Cooley, C. H. Human nature and the social order. (rev. ed.) New York: Scribners, 1922.

Cooley, C. H. Social organization. New York: Scribners, 1909.

Cooley, C. H. *Life and the student: roadside notes on human nature, society and letters*. New York: A. A. Knopf, 1931.

Crowne, D. P., & Marlowe, D. *The approval motive*. New York: Wiley & Sons, 1964.

Dahlstrom, W. G., & Welsh, G. S. *An MMPI handbook*. Minneapolis: University of Minnesota Press, 1960.

deGrazia, S. *Of time, work, and leisure*. New York: The Twentieth Century Fund, 1962.

Dreyfuss, F., & Czaczkes, J. W. Blood cholesterol and uric acid of healthy medical students under the stress of an examination. *Archives of Internal Medicine*, 1959, *103*, 708-711.

Dunn, J. P., Brooks, G. W., Mausner, J., Rodnan, G. P., & Cobb, S. Social class gradient of serum uric acid levels in males. *Journal of the American Medical Association*, 1963, *185*, 431-436.

Eckert, Ruth E., & Stecklein, J. E. Job motivation and satisfactions of college teachers. U.S. Department of Health, Education, and Welfare, OE 53009 Cooperative Research Monograph, No. 7.

Eckert, Ruth E., Stecklein, J. E., & Sagen, H. B. College faculty members view their jobs. *AAUP Bulletin*, 1959, *45*, 513-528.

Editorial. Which comes first--the success or the gout? *Journal of the American Medical Association*, 1963, *185*, 196.

Edwards, A. L. *The social desirability variable in personality assessment and research*. New York: Dryden, 1957.

Eells, W. C. *College teachers and college teaching: an annotated bibliography*. Atlanta, Georgia: Southern Regional Education Board, 1957.

Festinger, L. A theory of social comparison processes. *Human Relations*, 1954, *VII*, 117-140.

French, John R. P., Jr., & Kahn, R. L. A programmatic approach to studying the industrial environment and mental health. *Journal of Social Issues*, 1962, *XVIII*, 1-47.

French, John R. P., Jr., & Miller, D. R. Identity and motivation. In John R. P. French, Jr., *Self-actualization and the utilization of talent*. Technical Report, Cooperative Research Project, No. E-006, University of Michigan, 1963.

French, John R. P., Jr., & Sherwood, J. Self-actualization and self-identity theory. In John R. P. French, Jr., *Self-actualization and the utilization of talent*. Technical Report, Cooperative Research Project, No. E-006, University of Michigan, 1963.

Freud, Anna. *The ego and mechanisms of defense*. New York: International Universities Press, 1946.

Freud, S. *The problem of anxiety*. New York: Norton, 1936.

Freud, S. *Collected papers*. London: Hogarth, 1949.

Friedman, M., & Rosenman, R. H. Association of specific overt behavior pattern with blood and cardiovascular findings. *Journal of the American Medical Association*, 1959, *169*, 1286-1296.

Friedman, M., Rosenman, R. H., & Carrol, Bernice. Changes in serum cholesterol and blood clotting time in men subjected to cyclic variations of occupational stress. *Circulation*, 1958, *17*, 852-861.

Goffman, E. *The presentation of the self in everyday life*. Garden City, New York: Doubleday, 1959.

Gould, R. G. Sterol metabolism and its control. In *Symposium on atherosclerosis*, National Academy of Sciences, Washington: National Research Council, 1954.

Guilford, J. P. *Fundamental statistics in psychology and education*. New York: McGraw-Hill, 1956.

Haldane, J. B. S. Origin of man. *Nature*, 1955, *176*, 169-170.

Hilgard, E. R. Human motives and the concept of the self, *American Psychologist*, 1949, *4*, 374-382.

Jung, C. G. *Collected works*. Vol. XVII. *The development of personality*. New York: Pantheon Press, 1954.

Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthan, R. A. *Organizational stress: studies in role conflict and ambiguity*. New York: Wiley & Sons, 1964.

Kannel, W. B., Dawber, T. R., Kagan, A., Revotskie, N., & Stokes, J. Risk factors in the development of coronary heart disease. *Annals of Internal Medicine*, 1961, *54*, 1035.

Kasl, S. V., & French, John R. P., Jr. The effects of occupationsl status on physical and mental health. *Journal of Social Issues*, 1962, *18*, 67-89.

Kissin, B., Wolf, S., Dock, W., Wright, I.S., Russek, H. I., & Weiss, E. Emotional stress in coronary heart disease. New York Medicine, 1959, 15, 826-851.

Koch, S. Psychological science versus the science--humanism antimony: intimations of a significant science of man. American Psychologist, 1961, XVI, 629-639.

Leeper, R. D., Benua, R. S., Brener, J. L., & Rawson, R. W. Hyperuricemia in myxedema. Journal of Clinical Endocrinology, 1960, 20, 1457.

Lewin, J., Dembo, Tamara, Festinger, L., & Sears, Pauline. Level of aspiration. In J. McV. Hunt (Ed.), Personality and the behavior disorders, Vol. I. New York: Ronald Press, 1944. Pp. 333-378.

Liddle, L., Seegmiller, J. E., & Laster, L. Enzymatic spectrophotometric method for determination of uric acid. Journal of Laboratory and Clinical Medicine, 1959, 54, 903-913.

McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. The achievement motive. New York: Appleton-Century-Crofts, 1953.

McDougall, W. Introduction to social psychology. London: Methuen, 1908.

McKinley, J. C., Hathaway, S. R., & Meehl, P. E. The K-scale. In G. S. Welsh & W. G. Dahlstrom (Eds.), Basic readings on the MMPI in psychology and medicine. Minneapolis: University of Minnesota Press, 1956.

Mann, F. C. Towards an understanding of the leadership role in formal organizations. In Dubin, R., Homans, G., Mann, F. C., & Miller, D., Leadership and productivity. San Francisco: Chandler, 1965.

Mann, G. V. A method for measurement of cholesterol in blood serum. Clinical Chemistry, 1961, 7, 275-284.

Mead, G. H. Mind, self, and society. Chicago: University of Chicago Press, 1934.

Mead, G. H. The social psychology of George Herbert Mead. Chicago: University of Chicago Press, 1956.

Meehl, P. E., & Hathaway, S. R. The K-factor as a suppressor variable in the MMPI. In G. S. Welsh, & W. G. Dahlstrom (Eds.), Basic readings on the MMPI in psychology and medicine. Minneapolis: University of Minneapolis Press, 1956.

Metropolitan Life Insurance Company. New weight standards for men and women. *Statistical Bulletin*, Vol. 40, Nov.-Dec., 1959.

Mikkelson, W. M., & Dodge, H. J. The association of serum uric acid with blood sugar, serum cholesterol, and weight. Unpublished manuscript, University of Michigan, 1962.

Miller, D. R. The study of social relationships: situation, identity, and social interaction. In S. Koch (Ed.), *Psychology: a study of a science*, Vol. V. New York: McGraw-Hill, 1963. Pp. 639-737.

Miller, D. R., & Swanson, G. E. *Inner conflict and defense*. New York: Henry Holt & Company, 1960.

Miller, J. G. Information input overload and psychopathology. *American Journal of Psychiatry*, 1960, *116*, 695-704.

Morse, Nancy C., & Weiss, R. S. The function and meaning of work and the job. *American Sociological Review*, 1955, *20*, 191-198.

Moses, C. *Atherosclerosis*. Philadelphia: Lea & Febiger, 1963.

Murphy, G. *Human potentialities*. New York: Basic Books, 1958.

Neel, J. V., Rakic, M. T., Davidson, R. T., Valkenburg, H. A., & Mikkelson, W. M. Studies on hypoeruricemia II. A reconstruction of serum uric acid values in the families of Smyth, Cotterman, and Freyberg. *American Journal of Human Genetics*, 1965, *17*, 14-22.

O'Brien, W. M., Burch, T. A., & Bunim, J. J. Genetics of hyperuricemia in Blackfeet and Pima Indians. Paper read at American Public Health Association, New York, October, 1964.

Orowan, E. The origin of man. *Nature*, 1955, *175*, 683-684.

Rakic, M. T., Mikkelsen, W. M., Neel, J. V., & Duff, I. F. Studies on hyperuricemia I. An 18 year follow-up of 19 gouty families. Observations on the natural history of hyperuricemia and gout. *American Journal of Medicine*, 1964, *37*, 862-871.

Riesman, D. *The lonely crowd*. New Haven: Yale University Press, 1950.

Rodnan, G. P. Gallery of gout. *Arthritis and Rheumatism*, 1961, *4*, 27-46 (Feb.), 176-194 (April).

Rogers, C. R. *Client-centered therapy*. Boston: Houghton-Mifflin, 1951.

Sherwood, J. J. Self-identity and self-actualization: A theory and research. Unpublished doctoral dissertation, University of Michigan, 1962.

Stetten, D., Jr. Gout. Perspectives in biology and medicine, 1959, 2, 185-196.

Stetten, D., Jr., & Hearon, J. Z. Intellectual level measured by army classification battery and serum uric acid concentration. Science, 1959, 129, 1737.

Stecklein, J. E. How to measure faculty work load. Washington: American Council on Education, 1961.

Talbot, J. H. Gout. (2nd ed.) New York: Grune & Stratton, 1964.

Thomas, C. B., & Murphy, E. A.. Further studies on cholesterol levels in the John Hopkins Medical Students: The effect of stress at examination. Journal of Chronical Diseases. 8, 661, 1958.

U. S. Bureau of Labor Statistics. Employment and earnings. Washington: Author, 1961, Vol. 7, No. 11.

Wilson, L. The academic man. *New York: Oxford University Press, 1942.*

Wylie, Ruth C. The self concept. Lincoln: University of Nebraska Press, 1961.

Zachau-Christiansen, B. Rise in serum uric acid during muscular exercise. Scandinavian Journal of Clinical Laboratory Investigation, 1959, 11, 57-60.

APPENDIX W

SELF-ACTUALIZATION, OVERLOAD, AND HEALTH: A THEORETICAL APPROACH[1]

Ernst F. Mueller

The present article shall introduce the reader who has no immediate access to American dissertations and to progress reports of unfinished studies, to new thoughts about the problems of physical and mental health in the professional realm.

That personality factors and factors of the social environment affect the physical and mental health of a person, has been shown by a multitude of studies. Less clear are the causal chains which underlie these relationships. The attempt to gain insight into these causal chains through a comprehensive, empirically testable theory seems rather new. Basic to this approach is the assumption that social factors influence the person's self-image, that the person evaluates this self-image mainly according to the norms of his social environment, and that the psychological reactions which result from this self-evaluation trigger physiological effects which may lead to maladjustment and finally illness. The center for this work seems at present the Institute for Social Research at the University of Michigan in Ann Arbor. The present state of the work is reported in the Journal of Social Issues, July, 1962.

The investigation of the relationships between self-actualization and health is a part of this larger program. The concept of self-actualization is special in the sense that self-actualization is neither a purely sociological concept, as for instance 'class', nor a purely psychological one, such as 'intelligence'. Self-actualization is a relational concept that assesses the correspondence between person and environment. While the character of a social class is undoubtedly influenced by psychological factors, the concept of class as a common fate in the market situation can be understood independently of these factors. Similarly, we know that sociological variables relate to the degree of intellectual performance, but in order to understand the concept of intelligence as the ability to solve new problems such sociological considerations are not necessary. However, neither the knowledge of a person's abilities nor our knowledge of the environmental conditions alone permits us to say whether or not a person utilizes his abilities. Only when we put both factors in relation to each other, can we speak of self-actualization.

---

[1] A German translation of this article is in press in Koelner Zeitschrift fur Soziologie und Sozialpsychologie.

As soon as one begins to analyze the concept of self-actualization one realizes the necessity to distinguish between two different meanings of the concept. On the one hand, self-actualization can be understood as the process of self-development. G. W. Allport (1) and Rogers (28) use the concept in this sense as a characterization of the human striving to develop given talents and to improve oneself. Goethe's "Faust" gives poetic expression to this concept. But on the other hand, self-actualization describes the degree to which a person uses his abilities in his occupation or in his life in general. Thus, we distinguish between self-development and self-utilization. Until now, our work has been concerned only with the concept of self-utilization. As said above, we consider self-actualization as the correspondence between developed abilities and environmental opportunities.

But immediately the question arises, when is this self-utilization achieved? Is it necessary to show correspondence between person and environment in all aspects of a person's life, or can we speak of self-utilization already when a person uses fully only his few outstanding abilities? In order to answer this question, we have to give a short exposition of what we mean when we speak of the 'self'.

The Concept of Self

A person, through his relation to the environment, develops perceptions and concepts which he uses to determine and distinguish the objects and events in his life space. We are only interested in a part of this universe of concepts, namely, those which the person uses for the perception and evaluation of persons, his own as well as others. We assume that the categories are similar and that they are independent of whether the person perceives or evaluates himself or another person. Self-perception can be assumed as the basis of all personal perception. This view seems well-supported by empirical research (e.g., 7). It is further assumed that changes in the perception of one's self are influenced by the same factors as changes of perceptions in general.

This theory of the self which underlies our work was introduced into the social sciences by Cooley (6) and Mead (24). In 1943 G. W. Allport wrote a review of the then existing literature and in 1961 Ruth Wylie (30) published a critical evaluation of the empirical research. During the last years the problem of the self has been taken up at the University of Michigan, mainly by Professors Daniel R. Miller and J. R. P. French, Jr. The work on the theory is still in progress, the positions are not yet fixed, and the only publication (as of December 1962) is an article by French and Kahn (11). D. R. Miller, in an unpublished manuscript, gives the following summary which is reported below in its essence.

Public identity is that which one represents in the eyes of others. Self-identity is the picture which one has developed of oneself on the basis of the reactions of others to one's own behavior. The self consists of many dimensions, which gain their relevance because of their ties to social events. The understanding of this relevance is common to the members of a given social group. Every person holds a position somewhere along these dimensions. This position, or this scale value, constitutes an attribute of the person. Personal value scales, developed during the social learning process, correspond to these self-dimensions so that some parts of the dimension are considered as negative, others as evaluatively neutral, and others as positive or even ideal. Certain dimensions carry greater importance for the life of the person than others. Changes of one's position along these central dimensions have far-reaching effects for the relationships between the person and his environment. Good and bad performances which are measured along corresponding performance dimensions are frequently generalized to the self as a whole.

Before we go on, the concepts mentioned above should be considered in more detail. We see an *identity dimension* as a collection of alternatively possible attributes, which form in the eyes of the person a roughly linear scale. All attributes have a common core of meaning, but vary in degree. The degree of an attribute determines its position along the dimension. Thus a self-attribute is the position of an attribute along a dimension which the person perceives as self-relevant. The self is the structure of all self-attributes. Every human characteristic which can be ordered along a uni-dimensional scale can be seen as a dimension, e.g., intelligence, honesty, strength, etc.(1)

A value scale is a one-dimensional ordering of evaluations which is attached to positions along the self-dimension. These value scales provide the basis for the person's evaluation of his own self-attributes and of the self-attributes of others. A person is evaluated positively when his self-attributes attract the evaluator. A person is evaluated negatively when his self-attributes repulse the evaluator. Although the evaluation is linked to the position of the self-attribute along the identity dimension, both can conceivably vary independently of each other. In other words, there can be changes in either the evaluation or the self-attribute without corresponding changes in the other.

But not only values scales correspond to identity dimensions. Since the image of the own self develops out of the perception of behavior acts, we also have to see performance dimensions as corresponding to the identity dimensions. We assume that for all abilities whose existence is inferred from the behavior of the person, and for all characteristics which are defined in terms of typical behavior acts, a corresponding performance dimension can be found. To various dimensions of work behavior, for example typing, and to various dimensions of moral or ethical behavior there correspond identity dimensions such as 'typing ability', 'generosity', or 'aggressiveness'. With the help of this conception we are able to define self-utilization quantitatively, namely as the discrepancy between a person's present self-attribute on an identity dimension and his typical performance along a corresponding performance dimension. A man with an IQ of 150 in an occupation that requires only an IQ of 100, there uses less intelligence than he has on the job. Of course, the totality of a person's occupational self-utilization will not only be determined by the degree to which he utilizes his intelligence. A great number of dimensions form the occupational self-identity.

---

(1) It should be mentioned that probably not all human characteristics can be expressed as positions along a dimension. French and Sherwood (14) suggest therefore the concept 'primary subset', a structure of interdependent attributes which are not necessarily ordered in a linear fashion. But since we talk in the present context of abilities and since degrees of abilities can be ordered linearly, we will continue to speak of 'dimensions'.

It should be pointed out that the 'self' we speak of should be understood as a perception, a cognitive structure in the mind of the person. Hume said, "I can never catch myself at any time without a perception, and never can observe anything but the perception" (15, p. 239). It is this cognitive structure of perceptions we speak of. The self-picture is a cognitive system with motivating and evaluating characteristics. In other words, we assume that the way in which a person perceives himself and his world will influence his motives and behavior. We believe that memories of one's parents and mythological heros are as real--affect behavior as profoundly--as the world of concrete objects. However, perception means more than just phenomenology. For the explanation of certain qualities of the self we find the assumption of 'unconscious perception' indispensible. We use this concept in order to refer to reactions which the person himself cannot consciously relate to others, but which can be inferred independently of the person's own report from slips of the tongue, GSR responses, and so forth, and which are in a predictable manner linked to a certain behavior. In summary, then, the self is the perceived structure of all positions on dimensions which a person consciously or unconsciously applies to himself.

The actual self, as we have defined it above, is not the only picture of the self the person forms. Besides this actual or present self we can define such pictures as the potential self, what a person could be; the ideal self, how the person ideally would want to be; the presented self, which is related to Jung's concept of 'persona'; and finally the aspired self, which is that picture of the self whose realization seems achievable. In the present context we are interested only in the aspired self. We have said that the person holds a position along each dimension which he applies to himself and that this position represents an attribute of the person. At the top of the dimension lies the attribute which the person considers as ideal. But this ideal attribute is by definition unreachable. However, between the ideal attribute and the present self-attribute lies another position which defines that attribute which the person feels he can reach. For example, a man who thinks of himself as a fair pistol shooter can believe that he could be a good shot, if only he concentrated better or practiced more. Being a good shot appears to the person as a realistic, achievable goal. Along the performance dimension which corresponds to the identity dimension of pistol shooter this means that a person who presently, let us say, scores 73 strives to reach 85. Eighty five represents for him that performance which corresponds to the aspired self-attribute of 'good shot'. Let it be clear that we are dealing here with the person's conception as to what is a realistic goal. Whether this goal is indeed for the given person a realistic one is a different question. The performance which corresponds to the aspired self-attribute is characterized by the Lewinian (16) concept of 'level of aspiration'. However, the concept of 'aspired self-attribute' is different from the concept of 'level of aspiration'.

The aspired self-attribute is a cognitive structure in the mind of the person. The concept of level of aspiration, on the other hand, refers to measurable behavior along a performance dimension.

So far we have defined only the concept of the aspired self-attribute. The aspired self is the total structure of all aspired attributes on all dimensions which the person consciously or unconsciously applies to a description of himself. The theoretical importance of this concept lies in the close relationship between aspired self-attribute and evaluation. What a person considers as good he is likely to strive for, and what a person strives for is likely to affect his conception of what is good. A beginner will be content if only he hits the target with each shot. Later, only a shot in the black may satisfy him. It is our assumption that the self-attribute to which a person aspires forms the reference point of his personal value standard. In other words, the personal value standard which corresponds to an identity dimension changes according to alterations in the position of the aspired self-attribute. Satisfying is what comes closest to the aspired self-attribute. Consequently, a person's evaluation of his present self-attribute is related to the discrepancy between the actual and aspired self-attribute. A club champion who wants to win an Olympic medal will evaluate his club championship differently from the person who only wants to be league champion.

There are advantages in this conception of the self as a structure of dimensions. Koch, in his discussion of theories of motivation, writes: "In the technical theories, the central assumption is that action is always initiated, directed, or sustained by an inferred internal state called variously a motive, drive, need, tension system, what-not, and terminated by attainment of a situation which removes, diminishes, 'satisfies', or in any other way alleviates that state" (20, p. 632). The motivating behavior is in all these theories always a means toward the regaining of some kind of equilibrium. The difficulty into which such theories get when they try to explain tension-seeking behavior, for example creative activities, has generally been countered by psychologists with the invention of new needs, for example with the assumption of a general human need for growth (see 22, 28). In contrast to the assumption of such general needs, we speak of value scales which correspond to identity dimensions and which are able to arouse, direct, and sustain behavior relevant to the realization of the particular value. Basically, this assumption stems from Lewin who considers values as motivating factors which are able to create behavior-influencing force fields (18). Since the value scale corresponds not only to the identity dimension but also to the corresponding performance dimension, the resulting force field will lead to the tendency to act in accordance with the values. We are now in a position to answer the question which we had posed earlier.

The Problem of Central Dimensions

The question was, how general must the correspondence be between person and environment, before we can talk about self-actualization. Our answer is that only dimensions which the person applies to himself and which moreover are positively valued or needed are relevant for self-actualization. This should be discussed in some more detail. We distinguish between value-utilization and need-utilization. It is assumed that human behavior acquires this evaluation originally according to the importance which the social environment attributes to that behavior.

It is further assumed that the person internalizes this evaluation, i.e., that social norms become personal value scales. Of course, the importance attributed to a given behavior will vary in the different social groups and a change from one group to another can lead to value conflicts within the person. But beyond this there is a realm in which the forming influence of the social environment is limited, namely, the realm of needs. As French and Kahn write (11, p. 11,12): "Both needs and values are defined as motives because both of them have the basic conceptual property of the ability to motivate goal-directed behavior in the person by inducing valences (or incentive values) on certain environmental objects, behaviors, or states of affairs." Values and needs are different, however, in their ability to induce evaluations of one's own self and of others. In describing form we can say that needs are accompanied by the feeling of 'I want', while values are accompanied by the feeling of 'I should'. French and Kahn (11, p. 15) assume "that this conceptual property of the ability to induce evaluations is unique to a value and does not apply to a need." This distinction is conceptually clear but in the individual case the differentiation might be difficult. A certain motivation can carry both features 'I want' as well as 'I should'. And what constitutes a need for one social group can be a value for another and vice versa. A person with a strong need for aggression may grow up in an environment which condemns aggression. It is our assumption--supported by empirical research--that the person in such a situation will accept the norms of the group in spite of his need, and that he will be faced by a need-value conflict as a consequence. Leo Simons' book Sun Chief (29) is an excellent case study of such a conflict and its solution. It is our assumption that the psychological correlates and the coping techniques will differ depending on whether the person is faced by a value conflict or a need-value conflict. However, the consequences are still unclear and in the further discussion we will not return to the distinction between value-utilization and need-utilization.

What has been said so far is not yet the whole answer. As already mentioned, certain dimensions occupy a more central position in the life of the person than others. Intelligence is probably, for a professor, more important than athletic prowess. The question what 'central' means is not yet solved to our satisfaction. We recognize that certain attributes possess a greater degree of selfness for the person but what we should understand as selfness or coreness is still uncertain. At present we are operating with two concepts, strength and generality of an attribute. French and Sherwood (14) deal with these concepts in the following way: The strength of a self-attribute is the combination of frequency and intensity with which a given self-attribute is used for the perception or evaluation of one's own self in comparison with other self-attributes. When a professor tries to picture himself to himself, he will think more frequently and with greater intensity of such attributes as intelligent, or creative, and less frequently and with less intensity of such attributes as well dressed, although these too may be attributes of his self as well. The unclarity lies, of course, in the concept of 'intensity'. What we mean by 'intensity' has not yet been finally determined. In our empirical work we usually ask for the 'importance' of an attribute relative to other attributes. We try to define the concept 'importance' for the subjects by asking how much a certain attribute contributes to the subject's total self-utilization or his self-esteem relative to other attributes.

The generality of a self-attribute is defined as the number of substructures of the self in which the attribute appears weighted by the strength of the attribute. We call the more complex and more differentiated of these substructures 'sub-identities'. Frequently, these sub-identities correspond to the social roles of the person. In how many of these sub-structures a given self-attribute appears and the strength of the attribute in each sub-structure define the generality of the self-attribute. The concept of generality assesses what we mean when we speak of a 'typical characteristic' of a person. It is related to Bruner's concept of the 'critical attribute' (5). It is these attributes of great generality which we tap in the "Who am I" questionnaires.

Thus our answer to the question "What are the central attributes which determine self-utilization?" says that attributes with a great generality contribute more to a person's self-utilization than those of low generality.

Self-Utilization and Overload

In the beginning we defined self-utilization quite generally as the correspondence between given abilities and the use of these abilities in specific environmental situations. But it is easy to say that deviations from this correspondence can go in two directions. On the one hand, the abilities of the person may be greater than the opportunities to utilize these abilities. On the other side, the demands of the environment may exceed the abilities of the person. In the first case we speak of underutilization, in the second case we speak of overload.

When we deal with ability or skill dimensions we can find, as was already said, quantifiable performance dimensions which correspond to the identity dimensions. The self-attribute of average courtesy corresponds to a position on a performance dimension which is characterized by behavior as it is expected of somebody who has learned the fundamentals of social intercourse. The evaluation of this self-attribute along the corresponding personal value scale develops out of the internalization of present and previous group norms. The standards of evaluation change to some degree with the norms of the currently most salient reference group. Therefore, in order to determine the self-esteem of a person correctly, a knowledge of the structure of these reference groups is essential. (We will talk more about self-esteem later on.) The correspondence of self-attribute and behavior might be called 'matching utilization'. We want to express by this term that an adult with a developed self who believes to possess an average degree of courtesy will consider a behavior as in accordance with his personality that requires of him not more or less than the fundamentals of social intercourse require. In its development this process is, of course, exactly reversed. Murphy (27) expresses this when he says that through his social relations a person "learns where he belongs, who and what he is" (27, p. 83). A person learns that he possesses an average degree of courtesy because relevant others in his environment have labeled his behavior repeatedly as corresponding to such a level of courtesy. In order to give a young person the impression that he is tactless and uncouth one has only to arrange things so that in situations which require tact, the definition of tact of the environment differs from the definition of tact the person has developed so far. Members of minority groups are frequently maneuvered into such situations. Of course, there are situations in which no social confirmation is needed to tell a person whether or not he possesses a certain self-attribute. When a heavy stone lies in my path and I lift it aside then I don't need any social confirmation to tell me my position along the dimension 'weight lifting'. But with the position on the dimension of 'courtesy' it is different. What constitutes courtesy or the lack of it is socially determined. We follow Festinger (9) when we assume that the dependence on social confirmation is a function of the lack of 'physical reality'. (The influence of the social environment on the evaluation of an attribute, however, is important in any case. We will discuss this below.)

But let us return to the adult person with an average degree of courtesy. Let us assume that a person with an average degree of courtesy towards ladies commits a crime and goes to jail. There are no ladies. In such a case we probably speak rightly of 'under-utilization'. But on the other hand, situations may arise that require of this same person a degree of courtesy toward ladies which he simply does not possess. This could occur, for example, if the person became a salesman in a store for ladies' apparel. In such a case we would speak of overload.

But overload itself is not a uniform concept. Further distinctions are needed. Basically we distinguish between qualitative and quantitative overload. Quantitative overload exists when the demands on a person are reasonable and compatible but when in combination and accumulation they exceed the person's ability to cope with them. A switchboard operator is an example. The lady may be able to handle all kinds of calls correctly.

But at a certain time so many calls may be coming in that she is simply unable to handle them all equally well. On the other hand, we have frequently situations in which a single demand requires a greater degree of ability than the person possesses. If somebody who knows how to operate a calculator is suddenly placed in front of a computer, then we have a case where we would be speaking of qualitative overload.

Considered in isolation this distinction of qualitative and quantitative overload is quite reasonable. But in the actual occupational situation we are hardly ever dealing with the use of a single ability. Even on the assembly line there is hardly a position which requires day-in day-out for eight hours the use of the same skill. What leads to overload in this situation is the relationship of the skills to each other, the relative time distribution of the required skills. In other words, the weighting which the person ascribes to the individual skills does not coincide with the weighting of these abilities in the actual work situation. Let us take a good secretary as an example. Let us assume that the lady loves her typewriter. Nevertheless, it is unlikely that it is her only wish to use the typewriter. It may be that she loves her boss even more. But if her job now requires the exclusive use of the typewriter and does not give her the opportunity to make coffee for the boss, then we will have to say that she is overloaded with typing even though typing is basically an attractive activity for her. The point at which an attractive activity becomes a source of overload has to be determined for each case individually. We are dealing here again with the question of the relative weighting of the dimensions. It is our assumption that the importance or centrality of a dimension will find some expression in the amount of time a person is willing to devote to its utilization. If typing is more important for a secretary's self-utilization than, let us say, half of all the skills required for her job, then we will consider her utilized if she can spend 50% of her time at the typewriter. But if she is forced to type 75% of her time she will feel overloaded. At the same time we have to realize that this overload is likely to imply the under-utilization of another dimension. The time which the secretary spends 'too long' at the typewriter has to come from somewhere, and a person usually does not have unnecessary waste-time in his daily life. (To assume that the secretary could work more intensively is no solution since we assume that a work intensity which exceeds the desired work intensity leads to a feeling of overload as well). Thus, while it is reasonable to speak of overload and under-utilization with respect to a given dimension, it seems better to use for the occupational situation in its totality a different term. When referring to the total occupational situation we speak of 'occupational self-actualization'. Expressed differently, we can say that every person carries within him the conception of different profiles, for example a profile of his skills, and a profile of the required skills. The comparison of the required skill profile with the profile of his own skills and preferred skill usages and the measurement of the discrepancies between these give us an assessment of the degree of the present occupational self-actualization.

A few words should be said with respect to the motivational basis of overload. Not all overload is caused by the environment. Dedication to a task can lead to overload as well, if the person in the service of that task demands too much of himself. A further cause of overload lies in what has been called 'work addiction' (3), the compulsive need to work which can be understood only with reference to unsolved personality problems. The motivational bases for under-utilization are probably, in similar ways, differentiated. It may very well be that the environment offers opportunities for self-utilization but that the person does not make use of them. It may be that the consequences of overload and under-utilization are different - depending on the underlying motivation, but we do not yet have any specific hypotheses in this respect.

Consequences of Under-Utilization and Overload

What are the consequences of under-utilization, overload, and of lack of correspondence between person and occupation? We do not deny the probability that overload and under-utilization have direct and harmful health effects. A man with a sitting occupation does not use his muscles sufficiently. Lack of exercise, under-utilization of muscles, on the other hand, is one of the factors in the pathogenesis of atherosclerosis (4). However, our investigation goes in different directions. We are interested mainly in the effects of overload and under-utilization on the occupational self-esteem of the person. That our empirical research must try to exclude alternative explanations is clear. Unfortunately, this ideal is very difficult to realize in the individual case. Before we discuss these relationships further, we should clarify the meaning of the concept self-esteem or self-evaluation.

The Concept of Self-esteem

The self-esteem of a person is defined as the evaluation of the totality of his self-attributes with each attribute's weighting according to its importance. This self-evaluation develops out of the reflection of one's evaluation by relevant others. A group forms, within a relatively short time, a detailed picture of every member, a picture that consists of those attributes that are important for the functioning of the group. The general esteem of the group for the member is the evaluation of the group-relevant attributes of the member. Since the esteem of the group affects its reactions, it is seldom difficult for the member to estimate the group's esteem for him. If the member is at all tied to the group, he will come to see himself as relevant others seem to see him. Mead writes (25, p. 215): "...the individual experiences himself...indirectly from the standpoints of the individual members...or from the general standpoint of the social group as a whole..." In his exposition of the 'mirror image of the self' Cooley assumes this sequence: "...the imagination of appearance to the other person, the imagination of his judgment of that appearance, and some sort of self-feeling, such as pride or mortification." (6, p. 183) Such statements as the ones quoted assume the tendency to behave in such a way as to maximize one's esteem in the eyes of others. The factors responsible for such an attitude are manifold, the need to be appreciated, the contribution with one's own action makes for the well-being of the group, and the practical advantages arising from the good will of others. The tendency to raise oneself in the esteem of others and the corresponding tendency to raise one's own self-esteem has impressed several authors, for example McDougall (23) for whom 'self-regard' is a major 'sentiment', and Rogers (28) who uses positive self-regard as a criterion for measuring gains in therapy. The motive to increase one's self-esteem and one's esteem in the eyes of relevant others occupies various realms of research. It is involved in the work that concerns itself with the social desirability of test answers.

Distortions of perception have also been related to the degree of self-esteem. The relationship between shame and guilt is the topic of several investigations and personality problems such as depression and compulsive neurosis have been understood as the result of certain states of one's self-evaluation. The strength of this motivation will depend on the degree of internalization of the group ties. Later in life most persons abandon the attempt to maximize self-esteem and restrict themselves to the attempt to keep self-esteem at an optimal level. The striving for an unrealistically high self-evaluation ends too frequently in failure and lowered self-esteem. A striving that takes account of the probability of success has in the long run the best chance to lift one's self-esteem to an optimal if not maximal level. The knowledge of the strength of the motive to increase one's self-esteem is essential for the correct understanding of the reactions to a threat to self-esteem. A person with a strong motive to increase his self-esteem will react with guilt, tension, and dissatisfaction in situations which do not elicit such reactions in persons with a weaker motive to increase self-esteem. The strength of this motive is one of the conditioning variables which we have to take into account in our investigations. One of the consequences of this motive is the fact that persons in order to increase their self-esteem try to utilize predominantly their positively evaluated abilities, an event which already Freud and Adler have pointed out.

The striving for self-utilization, however, is not only activated by such instrumental motivation as the tendency to increase one's self-esteem. We assume that there exists a natural tendency that wherever a self-attribute has a corresponding performance attribute the person will try to realize the self-attribute through the appropriate behavior. The greater the generality of an attribute the greater will be the tendency to behave accordingly. On the basis of this assumption we can say any kind of behavior, good or bad, can become functionally autonomous. The decisive factor is the degree to which a certain repeated behavior has succeeded in setting up and developing a corresponding self-attribute. The theoretical value of this approach lies in the fact that it gives the possibility of explaining the puzzling phenomenon that some activities never become functionally autonomous while others, even after a very short time, don't seem to need the support of any instrumental motivation. The use of this aspect of the theory allows us new insights and new measurement approaches in the area of selection, training, and usage of personnel. The old problem of the right man at the wrong place can be reformulated in new, quantifiable concepts by the use of self-identity theory. The degree of maladjustment is determined by the discrepancy between the person's position on an identity dimension and on a corresponding performance dimension. If the skill of the person is greater than the opportunities to utilize these skills on the job, we speak of under-utilization; if the demands of the job are greater than the skills of the person, then we speak of overload. Both concepts, overload and under-utilization, differ from the formulation of the problem in present day personnel psychology because in our approach we investigate the person's own abilities and not the results of aptitude tests. This approach complements the conventional view of the problem by describing the fit between man and job in a new framework which has greater relevance for questions of motivation and psychological adjustment. This approach can explain, for example, the lack of adjustment of a successful salesman to his job, a job which frequently forces the person to use exaggerated arguments in the selling of products, and which thus creates a conflict between sales success and honesty.

Aside from the motive to raise one's self-esteem, French and Miller (12) discuss two further determinants of the level of self-esteem. According to their views the level of self-evaluation is first a function of the personal evaluation of the self-attributes. What is tapped here is the realization that the person--though influenced by the group--is nevertheless not identical with it, and makes without doubt evaluations which are independent of the group norms or which are even in contrast to it. In a metatheoretical sense we assume that even these 'independent' decisions are developed out of the internalization of--earlier--group ties, but at the level of empirically verifiable facts we have to take into account a realm which is independent of group influences.

This, however, is not meant to say that the level of self-esteem is not also co-determined by the public evaluation of the person in the various reference groups. So far we have spoken of the level of the total self-esteem. But our assumptions also hold for the consideration of the single attribute. As soon as a self-attribute gains importance for the group, i.e., as soon as the self-attribute becomes part of the public identity of the person, the personal evaluation of it will be affected by group evaluations. The strength of the group influence depends on the reference power (13) of the group. We have described above how a person does not need a social environment to determine his position along the dimension 'weight lifting'. However, this 'physical reality' does give the person a standard for the evaluation of his physical strength. Is the ability to lift 100 pounds good, bad, or average? In order to answer this question the person must observe other persons of equal age and sex or he has to ask them, in order to compare his strength with theirs. The evaluation of an attribute is in any case open to social influence attempts. More than one reference group may be involved in the final personal evaluation of a given attribute. The evaluation of a person's total self-esteem is usually influenced by a great number of groups.

Self-Actualization and Self-Esteem

What are the consequences of insufficient self-actualization on one's job for the person's self-esteem? Our considerations rest on the assumption that the behavior of a person determines his self and that this tendency will be the stronger the stricter the social environment reacts not to the person's self but to his behavior. Some of the variables which determine whether this tendency will become a reality will be discussed below. Here we want to point out that any case of under-utilization creates in principal a force to lower the person's self-attribute along the identity dimension which corresponds to the performance dimension along which the under-utilization occurs. Since each identity dimension is associated with a value scale, the lowering of the position of a self-attribute contains the potential consequence of a lowered position along this value scale. Expressed in the form of a general theorem: Under-utilization leads to a threat to self-esteem. It is theoretically possible--as mentioned earlier--that a person chances his value standards in order to escape this threat to his self-esteem. However, in the occupational realm the forces against a change of value standards are usually very strong, thus lowering the empirical probability of such a reaction occurring.

In the case of overload is the answer to the question as to whether the consequences for self-esteem are more difficult. Let us consider first the case where the overload is caused exclusively by the environment. As long as in such a situation neither the behavior nor the value standard changes, there will be no tendency to change the self-attribute. As long as the person ignores the demands of the environment without guilt feelings, no threat to self-esteem exists.

However, if the person complies with the demands of the environment the situation changes. In this case there is the tendency to develop a new self-attribute and--as a result--a higher feeling of self-esteem. Whether this heightened evaluation of the new self-attribute leads to an increase in the person's total self-esteem, however, is a different question and depends on the fact of whether or not the heightened performance along one dimension is achieved through the under-utilization of other, maybe more central, dimensions. It is conceivable that a person becomes a master chess player at the expense of his career, but it is unlikely that this raises his total self-esteem unless he changes drastically the relative importance of the dimensions within the identity structure.

On the other hand, when a person accepts and internalizes the demands of the environment, the consequences of overload for self-esteem are again different. The environmental demands now become the person's level of aspiration. But to the level of aspiration corresponds an aspired self-attribute. Since, as we assumed, the personal value standard changes corresponding to changes in the aspired self-attribute, the evaluation of the present actual self-attribute will also change. Through the change of the value standard the present actual self-attribute will be evaluated less positively. If in such a situation the person does not live up to the internalized demands, a threat to self-esteem will be the result.

But what if the person does live up to the internalized demand and thus raises his self-attribute according to the increased performance so that it coincides with the aspired attribute? The answer will depend on the fate of the aspired attribute. Several ways of thinking are possible. We are inclined to argue as follows: We assume that the motive for self-utilization arouses the tendency to set the aspired self-attribute higher as soon as it has been reached. In this case, the personal value standard would shift so that it is conceivable that the self-esteem remains the same but does not increase. However, two factors speak against this: (a) The motive for self-utilization and the connected tendency to raise the aspired self-attribute varies from person to person and within a person from attribute to attribute. In our empirical research we measure the strength of the motive for self-utilization as one of our conditioning variables. (b) Secondly, the aspired self-attribute--as the other concepts--is conceptually a quasi-stationary equilibrium and the higher the level of this equilibrium the stronger are the forces against a further raising of the level (17). In the continuing process of reaching and raising of the aspired self-attribute the magnitude of the discrepancy between the two will decrease. In the long run the person will approach the aspired self-attribute more and more and thus raise his self-esteem.

In summary, we can say that the answer to the question whether or not overload will lead to a threat to self-esteem depends theoretically on the degree of internalization of the environmental demands and on the performance of the person, whether or not the performance fulfills the demands of the environment. In the empirical investigation of these problems the strength of the motive for self-utilization must be taken into account as a conditioning variable.

Threat to Self-Esteem and Psychological Reaction

We can now go a step further and ask: Granted that there is a threat to self-esteem, what determines whether or not that will lead to a psychological reaction? In other words, we are asking for the variables which condition the next link in our assumed causal chain. One of these variables has already been discussed, the strength of the motive to raise one's self-esteem. According to our theory we do not see this motive as a general human tendency, but we think of it as varying according to the centrality of each attribute. A person may use every trick in the book to raise his occupational self-esteem. The same person may be totally indifferent to whether or not he is also a good athlete. We feel that 'motivation' is conceptually not a mythical, all-pervasive libido but a structure of forces which direct and sustain specific behavior acts which correspond to self-attributes. Consequently, we assume that the strength of each motivation changes with the centrality of the relevant self-attribute.

The ways and means for the raising of the self-esteem are undoubtedly numerous and we will mention a few below. But we deal in our work mainly with occupational self-esteem and occupational self-utilization. In this realm the forces toward adjustment to the reality of the situation are usually so strong that a great number of theoretically possible ways of increasing one's self-esteem are practically not available to the person. For example, a person who fails in his occupation and who considers this a threat to his self-esteem can theoretically raise his self-esteem by reducing the occupational sub-identity in its importance. But since the majority of us--aside from the psychological importance--are dependent on income from an occupation, the choice of such a method of maintaining self-esteem is usually rather ineffective and thus improbable. We are willing to assume that the only rational and effective way to raise the occupational self-esteem in the occupational realm lies in increased performance, either absolute by doing a better job or relatively by getting a different, less demanding job. We are willing to consider the existing tests of need achievement as possible indicators of the strength of the motive to raise one's self-esteem in the occupational realm.

Another variable that should be considered is the time perspective with which a person perceives an overloading demand. It is quite possible that investigation will show that occasional periods of middle overload are desirable for the person's well-being and that only chronic overload has harmful effects on a person's health. The time perspective is important for at least two reasons: (a) If overload leads to psychological reaction, which brings on harmful physiological reactions, then these potentially harmful physiological reactions will last the longer the overload lasts. And while on the one hand certain small temporary changes in the person's physiological equilibrium may be stimulating, the same changes as a chronic condition may lead to illness. (b) But secondly there are indirect reasons. The time perspective is an essential aspect of a person's frame of reference. Within it he interprets the events of his life. If a person is not able to see an end to a situation of overload or under-utilization, then the resulting hopelessness may aggravate the consequences of a lowered self-esteem. On the other hand, if the overload is, let us say, the consequence of a new job position, then it might be perceived as temporary. In this case the particular time perspective would neutralize the negative psychological reactions.

A third conditioning variable lies in the nature of the coping techniques a person uses. If a person sees his self-esteem threatened by a situation of overload or under-utilization and reacts to this threat by changing his environment so that the threat is eliminated, then it will not come to harmful psychological reactions.

A change of the environment is, of course, only one of the ways to avoid a threat to one's self-esteem. A person may also try to alter his self-identity. French and Miller (12) discuss this question. If, as discussed above, the level of a person's total self-esteem is determined by the evaluation of the single attribute with each attribute weighted according to its centrality, then it follows that the person can change his total self-esteem by changing the centrality of given attributes. If an attribute lies in its evaluation above the average of all self-attributes, then an increase in centrality of that attribute strengthens self-esteem and vice versa. A person can therefore--within variable limits--manipulate the level of his self-esteem through changes in the centrality or importance of 'good' and 'bad' attributes.

We have further assumed that if the centrality of an attribute increases, if it becomes a more important part of the self, then the tendency to utilize this attribute is also increased. On the basis of earlier behavior a person develops, let us say, the self-attribute 'good administrator'. The greater the centrality of this attribute the more the person will be motivated to emphasize the administrative aspects of his job. The greater the centrality of a positively valued attribute, the stronger is the motivation to engage in the corresponding behavior. A correlate of the above sentence is that a person can raise his self-esteem by restricting his performance to those dimensions which contribute most to his self-esteem. A person compensates for his weaknesses by restricting himself to behavior that reflects his strong attributes. In other words, a person tends to do what he is good at and to avoid what he is bad at.

If the person is forced to act in a way which reveals his weaknesses, then he may try to avoid an evaluation of these performances. However, this is frequently made impossible through the evaluating responses of others.

If the person is forced to evaluate bad performances as such, then he may retreat to a third line of defense and deny that the bad performance is in any way indicative of a low position of his self-attribute on the dimension in question. In situations like the appraisal interview in industry the subordinate cannot escape the evaluation through the boss. However, the person may try to defend his self-esteem by disassociating the evaluation of the performance from any evaluation of the self. This can take several forms: accusing co-workers, tools, working conditions, or claiming illness, and so forth.

Psychological Reaction and Physiological Reaction

But assume now that the threat to self-esteem leads to guilt feelings, tension, and dissatisfaction. Does that necessarily imply the occurrence of physiological reactions? Not necessarily. There is for one thing the person's constitution as a conditioning factor. People differ in the degree to which their physiological processes are responsive to emotional influences. Secondly, we have to realize that all the defense mechanisms which were discussed earlier may affect this link in the causal chain as well. If a person succeeds in denying and rationalizing successfully the tensions and guilt feelings, he may be spared any physiological reactions. However, an unsuccessful repression or working through might well lead to a greater severity of the physiological reactions.

What can we say about the connection between psychological and physiological reaction? For the most part we are here still dependent on the demonstration of correlations. So far we have related our variables mainly to rather global measures of illness behavior, for example, the number of visits of a worker to the dispensary (19). But our interest is shifting more and more to the study of continuous physiological variables such as blood pressure, cholesterol, and diurnal rhythm. That these variables are related to psychological factors has been sufficiently demonstrated in the literature. Epstein (8) and Brightman (4) review in their surveys of the literature numerous studies which relate psychological stress with blood pressure, for example, or cholesterol. The relation between the cyclical body functions and self-esteem has been demonstrated in a study of shift work (21).

The programmatic approach outlined here in some of its aspects seems new because of the attempt to extend the chain of causal links so that not only psychological and physiological factors are related to each other but by considering also the person's reactions to his job situation and his social environment. Few existing investigations operate within such a far-flung and yet theoretically relatively-structured framework. Many of the now existing data could be subsumed and reinterpreted in terms of this approach. Taken by itself each of the existing investigations usually considers only a part of the chain of connections described here. Our work, supported by the Office of Education and the National Institute of Mental Health, tries to study the relationships in their wider context. The beginnings of this work, published in the summer of 1962, are encouraging.

Finally, two likely critiques should be countered. The present article does not describe the full complexity of our approach. On the one hand, this would exceed the framework of an article, and on the other hand, a number of articles dealing with particular problems are in press. But beyond this we have to confess that a definitive exposition is simply not yet possible. Many aspects are still unclear, and the conception of some concepts is still changing from investigation to investigation. Secondly, this article does not say much about the operationalization of the concepts and the methods of measurement by which we try to assess our concepts. It seemed better to defer these problems for discussion in a separate article. We believe that this article has fulfilled its purpose if it has succeeded in arousing the reader's interest in our approach.

BIBLIOGRAPHY

1. Allport, G. W.
   Becoming: basic considerations for a psychology of personality. New Haven: Yale Univ. Press, 1955.

2. ________
   The ego in contemporary psychology. *Psychol. Rev.*, 1943, *50*, 451-478.

3. Bradley, N.
   The work addict. *Sales Management*, July 7, 1961.

4. Brightman, I. J.
   Epidemiology of coronary heart disease. *Health News*, 1962, *39*, No. 8, 12-19.

5. Bruner, J. S., *et al.*
   A study of thinking. New York: Wiley, 1957.

6. Cooley, C. H.
   Human nature and the social order. New York: Scribners, 1962.

7. Deutsch, M., and Solomon, L.
   Reaction to evaluation by others as influenced by self-evaluation. *Sociometry*, 1959, *22*, 93-112.

8. Epstein, F. H.
   The epidemio-ogy of coronary heart disease. In A. M. Jones (Ed.) *Modern Trends in Cardiology* (in press).

9. Festinger, L.
   A theory of social comparison processes. *Human Relat.*, 1954, *7*, 161-174.

10. French, J. R. P., Jr., Kahn, R. L., and Mann, F. C. (Eds.)
    Work, health, and satisfaction. *J. soc. Issues*, 1962, *18*, No. 3.

11. French, J. R. P., Jr., and Kahn, R. L.
    A programmatic approach to studying the industrial environment and mental health. *J. soc. Issues*, 1962, *18*, 1-47.

12. French, J. R. P., Jr., and Miller, D. R.
    Identity and Motivation. Ann Arbor: Institute for Social Research, 1963, (unpublished).

13. French, J. R. P., Jr., and Raven, B.
    The bases of social power. In D. Cartwright (Ed.) *Studies in Social Power*, Ann Arbor: Research Center for Group Dynamics, 1959.

14. French, J. R. P., Jr., and Sherwood, J. J.
Self-actualization and self-identity theory. Ann Arbor: Institute for Social Research, 1963 (unpublished).

15. Hume, D.
Treatise on human nature, Volume I. New York: Dutton, 1920.

16. Lewin, K., Dembo, T., Festinger, L., and Sears, P.
Level of aspiration. In J. McV. Hunt (Ed.), *Personality and the behavior disorders*, Volume I, New York: Ronald Press, 1944, 333-378.

17. Lewin, K.
Field theory in social science. New York: Harper, 1951.

18. __________
Dynamic theory of personality. New York: McGraw-Hill, 1935.

19. Kasl, S. V., and French, J. R. P., Jr.
The effects of occupational status on physical and mental health. *J. soc. Issues,* 1962, *18*, 67-89.

20. Koch, S.
Psychological science versus the science-humanism antimony: intimations of a significant science of man. *Amer. Psychologist*, 1961, *16*, 629-639.

21. Mann, F. C., and Hott, P.
Shiftwork and mental health. Ann Arbor: Institute for Social Research, 1963 (unpublished).

22. Maslow, A. H.
Deficiency motivation and growth motivation. In M. Jones (Ed.), *Nebraska symposium on motivation, 1955*. Lincoln, Nebraska: Univ. of Nebraska Press, 1955, 1-30.

23. McDougall, W.
An introduction to social psychology. Boston: Luce, 1908.

24. Mead, G. H.
Mind, self, and society. Chicago: Univ. of Chicago Press, 1934.

25. __________
The social psychology of George Herbert Mead. Chicago: Univ. of Chicago Press, 1956.

26. Miller, D. R.
The study of social relationships: situation, identity, and social interaction. In S. Koch (Ed.), *Psychology, study of a science*, Volume V (in press).

27. Murphy, G.
Human potentialities. New York: Basic Books, 1958.

28. Rogers, C. R.
Client-centered therapy. Boston: Houghton-Mifflin, 1951.

29. Simons, L. (Ed.)
Sun Chief, the autobiography of a Hopi Indian.
New Haven: Yale Univ. Press, 1942.

30. Wylie, Ruth C.
The self-concept. Lincoln, Nebraska: Univ. of Nebraska Press, 1961.

APPENDIX X

The Relation of Serum Urate Levels to Drive, Achievement and Leadership in University Professors(*) (**)

George W. Brooks, MPH, and Ernst Mueller, PhD

(*) Journal of the American Medical Association (In press)

(**) George W. Brooks, Research Associate, Institute for Social Research, Survey Research Center, and Associate, the Mental Health Research Institute, University of Michigan, Ann Arbor, Michigan.

Ernst Mueller, Research Assistant, Group Dynamics, Institute for Social Research, University of Michigan, Ann Arbor, Michigan.

The work reported here was supported in part by grants OE 3-10-115 from the United States Office of Education and AM 06928 from the United States Public Health Service.

Synopsis-Abstract

The purpose of this study was to test the hypothesis that personal characteristics of drive, achievement and leadership are positively associated with the level of uric acid in the serum. Among seven behavior scales which were developed, drive, achievement and leadership correlated most highly with serum urate levels. The correlation coefficient between the total of all behavior scales and serum urate in 51 University of Michigan Professors was $r = .66$, a very high order of relationship for such studies between behavior variables and physiological ones. The results of this study lend substantial support to the hypotheses that a tendency to gout is a tendency to the executive suite, and that serum uric acid is related to behavioral characteristics that lead to outstanding performance. There is now a need for pharmacological experiments to see if the concept of serum urate as an endogenous cortical stimulant can also be supported.

Students of gout have associated this disease with a high level of intellectual attainment. They have been impressed by the fact that this disease is commonly mentioned by national biographers, and frequently encountered among persons of distinction and achievement.[1] In 1955 Orowan[2] pointed out that significant levels of uric acid exist among mammals only in the blood of higher apes and man. He proposed, but did not prove, that uric acid, like other purines, caffeine and theobromine, has the ability to stimulate the cerebral cortex. He postulated that the superior cerebration of man and primates was due to high levels of uric acid in these animals, resulting from a mutation responsible for the loss of hepatic uricase. Later that same year Haldane[3] proposed some testable consequences of Orowan's Hypothesis for an endogenous cortical stimulant. Among these were the suggestions that hyperuricemics are on the average more intelligent, or at least less susceptible to some kinds of fatigue, than others. In 1959 Stetten and Hearon[4] studied the relation between serum uric acid concentration and army intelligence tests in 817 army inductees. The correlation coefficient between these two variables was found to be +.0759, low but statistically significant.

In 1963, Dunn et.al.[5] noted a social class gradient of serum urate levels in males. This report indicated that serum urate levels appeared to be more related to the achieved social status of the individual than to that of his ancestors; that perhaps a tendency to gout was a tendency to the executive suite. In an editorial which accompanied the communication, the JAMA[6] stated: "If this observation is to fit with the evidence for a substantial genetic influence, (in hyperuricemia) one is forced to conclude that the serum uric acid value is related to behavioral characteristics that lead to outstanding performance and therefore to upward social mobility or the maintenance of high social status achieved by one's forefathers."

It is the purpose of this study to investigate the hypothesis that drive, achievement, and leadership are positively associated with the level of uric acid in the serum.

Methods

The data of this study derived from medical examinations, self-administered questionnaires and interviews of professors at the University of Michigan who entered the voluntary periodic faculty health examination between August 1963 and February 1964. Between 75 - 80% of those invited avail themselves of this opportunity. Not all of these were eligible for this study. Only males in academic positions who were not on leave, had just finished a sabbatical leave, or were expecting it at the end of the semester were included. In all, 136 persons were eligible for the larger study of which this report is one aspect. Of the 136 eligible, 122 or 90% were willing to participate in our study. These less than perfect response rates could introduce a selection bias but without much further study it is difficult to say whether such bias exists and if so what kind of bias it is. Blood samples could not be obtained on 9 of the 122 cases for the determination of serum uric acid values. This is not done routinely as part of the periodic examination. Thus, the final sample consisted of 113 males in the academic ranks of assistant, associate, and full professor.

Serum uric acid determinations were performed in our laboratory according to the enzymatic spectrophotometric method described by Liddle, Seegmiller and Laster.[7] Cholesterol determinations are routinely performed during the period examination according to the method of Mann[8] in the laboratory of the University Health Service under the supervision of a research cardiologist.

Data on obesity, diastolic blood pressure, glucose tolerance levels, and diagnosis were available from the medical examination records. The self-administered questionnaire provided, among other things, data on appetite, consumption of coffee and alcohol, smoking, hours of sleep, feelings of being overburdened on the job, i.e., the degree to which an individual feels he has too great a quantity of work.

The Training Group

The data on work behavior were gathered and recorded by one person, a clinical psychologist, in a two-hour semi-formal interview.

Identical questions were asked of all professors. The questions varied in the degree to which they encouraged free and undirected responses. The introductory question was simply, "How would you describe your job, what do you do?" On the other hand, such specific questions were asked as, "Could you estimate how many hours per week you spend on all your professional activities?" The professors liked being interviewed and to all appearances gave honest and spontaneous answers. Later informal feed-back from the professors on their reaction to the interviews confirmed this impression.

On the bases of tentative hypotheses, a coding sheet was assembled. Then six cases with low serum uric acids were selected from among the first 80 cases collected in the course of this investigation. These were studied for the presence of meaningful dimensions that might be discriminating.

Eleven cases were then selected at random in order to test whether the presence or absence of these dimensions could be assessed in other than extreme cases. On the basis of these 23 cases, the following seven dimensions were developed:

1. Drive - This variable is a measure of the individual's output of energy in the totality of his daily activities. The men recorded as high on this variable live a life in which they are constantly working at top speed or with great intensity.
2. Achievement - This focuses primarily on the occupational self-esteem and self-confidence of the professor. It is evaluated by the actual achievement of the man as well as by the degree of pride with which he reports these achievements.
3. Leadership - This variable is a measure of the tendency to lead others by persuasion. It involves strong interest in the smooth functioning of inter-personal relations and usually a greater interest in manipulating people than things.
4. Pushing of Self - This concept involves persistence and tenacity, particularly in the pursuit of professional goals. Operationally this is most clearly seen in terms of hours spent on the job and in reports of pressing professional activities to the limit of the individual's capacity.
5. Range of Activities - This covers the application of professional and other skills in off-campus activities at the national, state, or community level, particularly when these are not inhibited by devotion to family nor stimulated by monetary rewards.

6. Attitude towards Pressure - The concept involved here is an optimistic and aggressive attitude towards a life which is productive but not burdensome. Operationally the people scored highest on this variable are those who "thrive on pressure".
7. Emphasis on Research - Operationally it is easy to detect the professor who is more interested in research than teaching. Conceptually this probably reflects status-striving in the current academic environment. It is a variable that would be operationally irrelevant in another setting.

Detailed coding instructions for these variables were written.[9] Thus, while the interview was only partly structured, the rating instructions are detailed and specific. Their use in similar groups should allow a replication of findings. No rating was done before all the interviews were collected. Each of the seven dimensions was scored on a three-point scale by the same two raters throughout. The combined scores of the two raters on each of the seven dimensions-ranging from 2 to 6--were summed to give the Total Behavior Score, ranging from 14 to 42.

Since the semi-formal interview was not specifically designed for the measurement of the above dimensions, it was necessary for the authors to train themselves in coding the interviews and to become attuned to the right clues. Thirty-nine cases were used for this training. They were coded independently by the two raters without initial knowledge of the serum uric acid values. However, after every batch of five or six ratings the serum uric acid values were made known and the raters discussed discrepancies in their assessments.

The Test Group

The remaining 51 cases were coded independently and blindly by the two raters without discussion and without the knowledge of the actual serum uric acid values. In order to check for the possibility of a systematic change in the rating criteria over time this Test Group was split chronologically into an early group of 26 cases and a late group of 25 cases. The reliability and the correlation between Total Behavior Score and serum uric acid for each group separately were computed and compared. The results of this comparison are presented in Table 1.

Table 1 about here

It is obvious that none of the differences are significant at the $p < .05$ level which was adopted throughout this study as the criterion for statistical significance.

The reliability of the Total Behavior Score was assessed by computing the correlation of the scores of the two raters and correcting this correlation coefficient by the Spearman-Brown formula for estimated reliability when the length of a test is doubled. As Guilford[10] points out, the pooled judgments of two observers yield an increased reliability in the manner found for the doubling of a test thus making the use of this formula applicable to our situation.

It is believed that the high reliability may reflect two things: (a) an expression of the objective nature of some of the questions, (b) the success of the extensive training period which preceded our final independent and blind ratings and for which a total of 62 of our 113 cases were used.

Table 2 about here

The inter-relationships among the seven subscales are shown in Table 2. Since the average inter-correlation among the subscales is relatively small ($r = .26$, $p > .05$), the Total Behavior Score does not constitute a factorially pure measure. Table 2 also shows that all subscales correlate significantly with the Total Behavior Score. Since these are part-whole correlations and thus inflated, seven sub-total scores were computed for each person, i.e., the Total Behavior Score minus this score on each of the seven subscales. The correlation between the subscale scores and the Total Behavior Score minus a given subscale score are presented in the last row of Table 2. Five of the seven subscales continue to correlate significantly with the sub-total scores which do not include the particular subscale score.

The correlation between the Total Behavior Score and the K-scale of the MMPI is only $r = .09$ ($p > .05$).[11] This would seem to indicate that the professors' defensiveness and interview attitudes had little effects on the ratings of their work behavior.

Findings

The mean serum uric acid value in this sample of University of Michigan professors is 5.66 with a standard deviation of 1.17 mg/100 ml (N = 113). Executives have been found to have a mean value of 5.73 with a standard deviation of 1.21 mg/100 ml.[5] Serum urate levels are independent of age ($r = .09$, $p > .05$). While full professors have the highest mean serum uric acid values, 5.95 mg/100 ml, associate and assistant professors have mean values of 5.50 mg/100 ml, the difference is not significant.

Total Behavior Scores show a similar distribution of mean values. Full professors are rated highest, associate and assistant professors have practically the same mean values. The difference among these groups is significant, however ($p < .05$). The correlation between age and behavior score within each status group is negative; in other words, the younger men at status level show greater achievement orientation.

The correlation coefficient between serum urate levels and the Total Behavior Score in the test group of 31 professors is .66. Differences in the correlation coefficients among the three status groups are not significant. The correlations of serum uric acid with the Total Behavior Score and with each behavior subscale are shown in the first column of Table 3. Drive, Leadership, Achievement and Range of Activities correlate highest with serum uric acid. Only two variables, Attitude towards Pressure, and Emphasis on Research do not correlate significantly.

Table 3 about here

The correlations in the bottom row of Table 2 indicate the degree to which a particular subscale measures what the remaining subscales measure in combination. In contrast to this the correlations in the last column of Table 3 indicate how those aspects of each subscale which are unique to it and which are not also assessed by a combination of the other subscales relate to serum uric acid.

Only one correlation coefficient is reduced to almost zero, Attitude towards Pressure. Only one correlation is significant at the $p <.05$ level, Leadership.

Other characteristics showing significant ($p <.05$) correlation with serum uric acid are worry about the job (= -.24), cholesterol ($r = .22$), obesity ($r = .26$), consumption of alcohol ($r = .19$) and good appetite ($r = .31$). No significant correlation exists with glucose tolerance levels, diastolic blood pressure, hours of sleep, consumption of coffee or smoking.

Despite the correlation between serum uric acid and cholesterol levels, there is no correlation between cholesterol and the Total Behavior Score ($r = .01$) and no significant correlation between cholesterol and any of the behavior subscales. This fact raised some interesting questions so it was decided to do partial correlations[10] of cholesterol holding uric acid constant and uric acid holding cholesterol constant with the several behavior variables.

The variables for which the "corrected r's" were significantly different are listed in Table 4. From this table it is clear that uric acid is differently related to this set of variables than is cholesterol.

Table 4 about here

Of particular interest is the fact that cholesterol levels tend to be higher and uric acid levels tend to be lower in those individuals with feeling of being overburdened, and in those who do not spend the major portion of their day in the persistent pursuit of professional goals.

This study has been concerned with the relationship between serum uric acid levels and behavior variables derived from a semi-formal interview. These variables have been shown to have a high degree of reproducibility. The technique for determining serum uric acid levels has, in our hands, demonstrated the same quality.[5] The findings of this study indicate the possibility of achieving a relatively high order of correlation between behavior variables and physiological ones, when classification errors can be minimized. Since we derived our measures from interviews not designed originally to provide specific answers to the questions raised by our hypotheses, there is a need for further studies specifically designed for the study of relationships between behavior and serum uric acid levels.

The fact that serum uric acid levels are highly correlated with the personal characteristics of drive, achievement, and leadership lends substantial support to the hypothesis that a tendency to gout is a tendency to the executive suite. We cannot say at present that the correlation with behavior is the only reason for the social class distribution of uric acid levels. It is clearly an important factor in this population in which we have shown that the association of urate level with behavior scores is much stronger than it is with status of the individual.

We tend to favor the notion of serum uric acid as an endogenous cortical stimulant, originally proposed by Orowan.[2] We believe, however, that our previous work with social class gradients of urate levels as well as this present study of university professors indicates that such possible stimulation has a much stronger relationship to achievement orientation in our culture than it has to high scores on intelligence tests. There is now a need for combined pharmacological and psychological experiments to test these hypotheses.

Our findings confirm the previously demonstrated association of serum uric acid with obesity[5,12,13] but not the association with glucose tolerance levels.[5,14,15] Studies published prior to this one have not demonstrated the association of serum uric acid and cholesterol levels in the same normal population.[5,16]

Since the Total Behavior Score has some of the characteristics of the "overt behavior pattern A" of Friedman and Rosenman[17] it was thought that the correlation between urate level and cholesterol might be accounted for by an association with the same personality variables. It is of considerable interest to find that this is not so. The fact that those individuals high in cholesterol tend to feel overburdened while those high on serum uric acid tend to feel the opposite, is consistent with and strengthened by the significantly contrasting correlations with Drive, Pushing of Self and Emphasis on Research. It would seem that tasks and responsibilities assumed as an expression of one's own drive in men with high urate levels are not experienced as unduly burdensome or unpleasant. This is in contrast to the sense of being driven associated with high cholesterol levels in medical students at examination time[18] or accountants at tax deadline time.[19]

Summary

University of Michigan professors with high serum uric acid values tend to have high scores on measures of drive, achievement, and leadership developed here. They show little concern with being overburdened in their jobs, do little worrying over their job situations but spend the greatest portion of their waking day on their work and related professional activities. They have good appetites, like their alcoholic beverages and are somewhat more obese. On the other hand, they do not sleep less, drink more coffee or smoke more than their colleagues. Cholesterol levels are slightly but significantly associated with uric acid levels. In this group they tend to be higher in men who appear to be driven rather than in men who drive themselves.

Acknowledgements

Drs. Sidney Cobb, John R. P. French, Jr., and Stanislav V. Kasl, our colleagues in the Institute for Social Research gave help, encouragement and constructive criticism. Dr. John C. Tupper of the University Health Service generously made available all needed medical information. Mrs. Margaret Stead of the Laboratory of the University Health Service supervised the collection of the blood samples and the performance of the cholesterol determinations.

References

1. Stetten, D., Jr. Gout. Perceptives in Biology and Medicine. 2:185-196, Winter, 1959.

2. Orowan, E. The origin of man. Nature. 175:683-684, (April) 1955.

3. Haldane, J. B. S. Origin of man. Nature. 176:169-170, (July) 1955.

4. Stetten, D., Jr., and Hearon, J. Z. Intellectual level measured by army classification battery and serum uric acid concentration. Science. 129:1737, (June) 1959.

5. Dunn, J. P., Brooks, G. W., Mausner, J., Rodnan, G. P., and Cobb, S. Social class gradient of serum uric acid levels in males. JAMA. 185:431-436, (August) 1963.

6. (Editorial) Which comes first--the success or the gout? JAMA 185:196, (August) 1963.

7. Liddle, L., Seegmiller, J.E., and Laster, L. Enzymatic spectrophotometric method for determination of uric acid. J. Lab. Clin. Med. 54:903-913, (December) 1959.

8. Mann, G. V. A method for measurement of cholesterol in blood serum. Clin. Chem. 7:275-284, (June) 1961.

9. Mueller, E. F. Some psychological and physiological correlates of work pressure - Unpublished Doctoral Dissertation - University of Michigan, 1965.

10. Guilford, J. P. Fundamental statistics in psychology and education. McGraw-Hill, New York, 1956.

11. Dahlstrom, W. G., and Welsh, G. S. An MMPI Handbook. The University of Minnesota Press, Minneapolis, 1960.

12. Shapiro, J. P., Klinenberg, J. R., Peck, W., Goldfiner, S. S., and Seegmiller, J. E. Hyperuricemia associated with obesity and intensified by caloric restriction. Abstract Arthrities and Rheum. 7:343, (June) 1964.

13. Gertler, M. M., Garn, S. M., and Levine, S. A. Serum uric acid in relation to age and physique in health and in coronary heart disease. Ann. Intern. Med. 34:1421-1431, (June) 1951.

14. Beckett, A. G., and Lewis, J. G. Gout and serum uric acid values in diabetes mellitus. Quart. J. Med. 29:443, (July) 1960.

15. Herman, J. B. Gout and diabetes. Metabolism. 7:703, (November) 1958.

16. Leeper, R. D., Benua, R. S., Brener, J. L., and Rawson, R. W. Hyperuricemia in myxedema. J. Clin. Endocr. 20:1457, (November) 1960.

17. Friedman, M., and Rosenman, R. H. Association of specific overt behavior pattern with blood and cardiovascular findings, JAMA 169:1286-1296, (March) 1959.

18. Thomas, C. B., and Murphy, E. A. Further studies on cholesterol levels in the Johns Hopkins Medical Students. The effect of stress at examination. J. Chron. Dis. 8:661, (December) 1958.

19. Friedman, M., Rosenman, R. H., and Carroll, V. Changes in the serum cholesterol and blood clotting time in men subjected to cyclical variations of occupational stress. Circulation. 17:852, (May) 1958.

TABLE 1.- Comparison of the data in the "Early Group" and in the "Late Group"

	Early Group N = 26	Late Group N = 25	Total Test Group N = 51
Interrater correlation	.87	.89	.88
Estimated Reliability	.93	.94	.93
Correlation between SUA and Total Behavior Score	.63	.68	.66

TABLE 2.- Intercorrelations, Total Behavior Score and Subscales (N = 51)

	Drive	Achievement	Leadership	Pushing of self	Range of Activities	Attitude towards Pressure	Emphasis on Research
Drive							
Achievement	.61						
Leadership	.62	.58					
Pushing of Self	.59	.19	.32				
Range of Activities	.38	.51	.55	.05			
Attitude towards Pressure	.24	.27	.19	-.03	.25		
Emphasis on Research	.15	.08	-.20	.40	-.16	-.14	
Total Behavior Score	.81	.78	.71	.50	.63	.42	.28
Total Behavior Score minus the subscale score	.74	.65	.53	.41	.54	.20	-.01

Correlations significant at the $p < .05$ level or better are underlined

TABLE 3.- Correlation of Total Behavior Score and subscales with serum uric acid (N = 51)

Variable	Pearsonian Correlation Coefficient	Corrected* r
Total Behavior Score	.66	--
Drive	.57	.18
Achievement	.54	.21
Leadership	.54	.33
Pushing of Self	.43	.24
Range of Activities	.51	.25
Attitude towards Pressure	.12	-.03
Emphasis on Research	.19	.26

Correlations significant at the $p < 0.05$ level or better are underlined.

*"corrected r" means the correlation between the subscale and serum uric acid after controlling for the relationship between the subscale and the sub-total score, i.e. the Total Behavior Score minus the particular subscale score.

TABLE 4.- Differential relationships between psychological variables, cholesterol and serum uric acid

Variable	N	Serum Uric Acid "corrected r"	Cholesterol "corrected r"*	Significance of the Difference
Total Behavior Score	51	.68	-.19	z=4.98 p= <.001
Drive	51	.59	-.19	z=4.24 p= <.001
Achievement	51	.53	.02	z=2.78 p= <.01
Leadership	51	.53	.10	z=2.39 p= <.05
Range of Activities	51	.52	-.07	z=3.17 p= <.01
Pushing of Self	51	.45	-.14	z=3.02 p= <.01
Emphasis on research	51	.24	-.24	z=2.34 p= <.05
Attitude toward pressure	51	.17	-.20	z=1.80 p= N.S.
Feeling of being overburdened	106	-.11	.25	z=2.50 p= <.01

*"corrected r" means the correlation between the variables after controlling for the correlation between cholesterol and serum uric acid (r = .22)